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The Pottery and Glass Industries

OF THE

North-Western Provinces and Oudh.

By H. R. C. DOBBS, C.S.



Published by Authority.

23113



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Ref 748.8095426
Dob

ALLAHABAD:

Printed at the North-Western Provinces and Oudh Government Press.

1895.



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A
MONOGRAPH ON THE POTTERY
OF THE
NORTH-WESTERN PROVINCES AND OUDH.

—o—
CHAPTER I.

THE POTTERY TRADE, ITS HISTORY AND DIVISIONS.

Section I.—Earthen vessels made on the wheel have been used in Hindustán without doubt ever since the Aryan invasion. The

The fabled origin of earthen vessels.

first known mention of them is in the Rig Védá, and by the traditions of these provinces their invention is attributed directly to the gods. One of these legends tells how Kopá Bhagat Rishi, the fabled progenitor of the potter caste, was ordered by Parmésvar to make earthen vessels. The Rishi's primitive method involved the baking of the pots for a full year, but on one memorable day, the Sukat Chauth or birthday of Ganeshá, after he had filled his kiln, a cat gave birth to some kittens in one of the pots. Hereupon the saint prayed earnestly for the safety of the kittens, who were preserved by Parmésvar's causing the vessels to be baked in the miraculously short time of one day. The residence of Kopá Bhagat is said to have been at Jagganáth, which is accordingly regarded by potters as their headquarters. Another account is that in old days people used to work up the clay for pots with their spittle, and Parmésvar deeming this unclean revealed the secret of the wheel.

Section II.—Whatever their origin may be, traditional ceremonies, superstitions and observances in which earthen vessels play a part

Rules concerning their use in Hindu and Muhammadan scriptures.

are inwoven with the life of a modern Hindu from his birth to his death. In spite of this fact the rules relating to them in the Hindu and Muhammadan scriptures are very few.

In the Smriti Sloka of Yajñavalkya we are told that an earthen pot once touched by food can be purified by being baked again in fire, but if touched by filth it can never be purified. The Matákshara asserts that an earthen vessel must be thrown away if touched by a Chándála, or man of like caste, while in one of the Shastrás the special privilege of using earthen vessels for three days without contamination is given to the inhabitants of the holy city Benares.

In strong contrast to this dislike of earthen vessels on the part of the Hindus is the practice of the Muhammadans, who are enjoined in the Darrimukhtar to use them rather than metal vessels, for the reason that the Prophet of God has said that "those who keep earthen vessels in their houses are visited with respect by angels."

Section III.—The pottery trade of these provinces is divided into five branches, namely, the manufacture of rude red pottery, of rude

Present divisions of the pottery trade.

glazed pottery, of painted and unglazed coloured wares, of ornamental pottery painted and glazed, and of clay models.

CHAPTER II.

ARTICLES OF DOMESTIC USE.

Section I.—The largest of these is the *mát*, *mathor* or big *matká*, the price of which ranges from three to eight annas. It is used for the storage of water. Smaller *matkás* are sold for one anna. The *gharra* or *gagari*, sold usually for about

Water pots. three pies, is used for drawing water from wells and for carrying water. It differs considerably in different districts in the width of its mouth and the shape of its body. The *matki* is a squat vessel with a wider mouth than the *gharra* and used for storing water.

The *kúnr* or *kowdra* is a vessel like the *gharra* with a longer neck, much used in Oudh for irrigation from wells. The *guruá* is a picturesque vessel used for carrying and storing Ganges water. It has two ears, one either side of the neck, pierced with holes so that it can be slung up by a rope. The average retail price of all these vessels is three pies. They are used for storing grain as well as for water. A *gharra* used for carrying water does not usually last more than three months, while if used for storing water or grain it may last for several years.

The *suráhi jhajhar* or *kúza* is a long-necked jar of various shapes. Its selling price is two for three pies, and it lasts, if in constant use, for about a month. It is used especially in the hot weather for holding drinking water, chiefly by Musalmáns. It is nearly always ornamented with incised patterns or moulded designs and is very commonly coloured. The *lutka* is a small vessel shaped almost like a cylinder, used for taking water out of a larger vessel. The *badhand* is shaped like a small *gharra* with a spout in the side. It is used by Musalmáns for bathing and especially for their religious ablutions, and is consequently never used by Hindus.

The *karua*, called in Almora and Garhwál *alúwa*, which exactly resembles the *badhana*, except for the fact that it has only a hole where the *badhand* has a spout, is used largely for carrying water, and is besides a semi-religious vessel, being necessary to various domestic rites of the Hindus. The *abkhora* or *bholna* is a drinking mug used almost exclusively by Musalmáns, and the *shakora* closely resembles it, being generally rather taller. Their price is three pies a pair. Of these water vessels the *suráhi*, the *abkhora* and the *shakora* are commonly made by Musalmán potters or kaskars, when they are to be found, while the rest are made by Hindu potters. But while Hindus often engage in the manufacture of the smaller drinking cups, Musalmáns appear to very rarely make large vessels such as *gharras*.

Section II.—Owing to the religious prejudices of the Hindus the use of earthen cooking pots is practically confined to Musalmáns,

Cooking pots. except in the case of travellers, who cannot carry much luggage. Musalmáns and low caste Hindus use chiefly the *hándi* or *hañriya*. That used by Musalmáns is squat-shaped and wide-mouthed, as it is used for cooking meat. The Hindu *hándi* is used only for grain and vegetables and is a longer, narrower vessel. Their price is about two pies. The *degchi* is much like the *hándi* and used for the same purpose. The *tandúr*, which is found chiefly among the Musalmáns of the northern districts, is a large egg-shaped jar heated by a fire which burns inside it. Bread is baked on the outside.

The *kapari* or *karheiya* is a big platter on which both Hindus and Musalmáns parch grain. The *kundá* or *kondá* is a thick basin in which Musalmáns knead their flour. The *tawá* is a round plate on which bread is baked over a fire.

Section III.—These again are used only by Musalmáns or very low caste Hindus. The *piyála* is a shallow bowl out of which

Vessels for eating out of. meat is eaten after being served up in the *tabáq*, a large plate. Meat is also sometimes eaten out of the "*rakábi*," *sanaki* or *sainak*, which is like a soup-plate, but in this rice is more commonly served. The *chammal* and the *tashtari* are dishes rather smaller than a *tabáq* and the *sifali* and the *chimli* much resemble the *piyála*. Of these vessels the larger are sold for about six pies each and the smaller for one pie each.

Section IV.—*Matkás* and *matkis* are the vessels most commonly to be seen in the shops of grain-sellers and in cultivators' houses,

Vessels for storing grain and dry goods. being used for storing purposes. When a larger vessel is needed a *dayard* or a *dahari* is used. The first is a cylindrical vessel sometimes as much as six feet high, the second is a small edition of the first. The *dahard* is generally of unbaked earth, made by the potter inside the house where it is to stand; the *dahari* is baked in the kiln.

For storing pickles and tobacco a long jar called *martabán* or *amritbáns* is used by both Hindus and Musalmáns. It is generally covered with lac on the outside.

Section V.—The *dudhándi* or *dohani* the *maliya* with a smaller mouth, and the *makeri* or *mihariya*—all resemble one another

Vessels for storing milk, oil, &c. and are used for storing milk and making butter. The *gariya* is a round-bottomed flask in which *ghí* is kept. These all sell for about two pies.

Section VI.—The *khujua* or *khujji* is a very small saucer holding about a mouthful of spirit and supplied by licensed vendors gratis

Vessels used by wine sellers. to their customers, who throw them away after drinking once. They are sold at the wholesale rate of 3,000 for Re. 1. The *bhurká* is a rough earthenware bottle holding about one seer, which often takes the place of a glass bottle.

Section VII.—Native pipes for tobacco-smoking consist generally of two parts, the *huqqa* or water holder and the *chilam* or tobacco

Pipes and their parts. holder, these two parts being separated by the stem, *naicha*. Owing to the rule that an earthen vessel may be contaminated after touching water, no self-respecting Hindu can use an earthen *huqqa*, which is only found among Musalmáns and very low caste Hindus.

The *huqqa panchkora* has a saucer fixed on to its base, which is pierced with small holes. The water to be used for cooling the tobacco is poured into the saucer, and when the smoker begins to smoke is drawn up through the holes into the body of the *huqqa*.

The *huqqa gauriya* is smaller than the common water bowl, and is made at Benares and Allahabad. Sold with the tobacco bowl for three pies.

The *huqqa madariya* is smaller and lighter than most, and is sold for three pies with the tobacco bowl and the stem. It is peculiar to Lucknow. The common *huqqa* is sold for three pies alone. The *chilam* or tobacco bowl is sold at the rate of 8 for 3 pies. *Chilams* made by Musalmán potters are for some reason usually considered superior to those made by Hindus, and they are peculiar for the broadness of the upper part, *chaturi*. The *chilam* for hemp-drug smoking is much narrower than that for tobacco and has scarcely any bowl. It sells at the rate of 12 for three pies.

Section VIII.—The most important of the vessels used in agriculture is the *kúnd* which is tied on to a rope in order to raise water from the well for irrigation. Ten or twenty of these are often broken in one day by the cultivators using them, and their consumption is therefore very large. The *kúnd* is one of the vessels supplied in most districts in return for customary dues received from the cultivator.

The *kolai* or *kalsi* is shaped much like a *milki* and is used to contain the sugarcane juice when first pressed out.

The *nánd* is a large, thick vessel used as a feeding trough for cattle.

Section IX.—The *chirógh* or *dipā* is the common oil-lamp of the country and is a tiny earthenware saucer holding about two chittacks of oil. The price is about one anna a hundred.

The *dawait* is a small circular ink pot, sold at four annas a hundred.

The *gamla* is the common flour-pot costing about Rs. 3 a hundred.

The *mokán ki jālt* is a pierced tile or screen set in walls to serve as a grating.

The *nagara* and *nagaria* are hemispherical basins which are formed into drums by stretching parchment tightly across their mouths. They are sounded in temples on certain occasions. The *hurák* is a vessel shaped like an hour glass, by blowing through which children produce exuberating melodies.

CHAPTER III.

MATERIALS AND THEIR PREPARATION.

Section I.—There are two kinds of clay which seem to be common to almost every district. The first is of a dark grey colour sometimes

Clay used.

nearly black, found at the bottom of every village tank or pond. This clay when baked by itself is of a dull red colour and produces a very strong earthenware. It is accordingly used for large vessels such as *nānds* and *gharros* and for all cooking pots that have to stand the fire. It is also used for all glazed ware. Its common name is *kālī mitti*, black earth, but there are many local variations. In Budaun and Aligarh it is called *chikka mitti*, in Hardoi, Bulandshahr, Rāmpur, Moradabad and Agra *chikni mitti*, in Basti *lasur*, in Almora *chopeo káto máto*; in Hamirpur *kabár már*, in Banda *már* and in Kheri *sehna*.

The second clay is light red or dark yellow and is to be obtained in every district either on the surface of the ground or a few feet below it. It is more easily manipulated than the grey clay but more brittle and porous. It is used for the manufacture of small articles, such as cups, saucers and earthen lamps. In most districts it is known as *pīlī mitti* or yellow earth, but its name in Partābgarh is *pāra*, in Bareilly *dhandora*, in Hamirpur *padua*, in Sultānpur *gaiwān*, in Allahabad *parīr*, in Kheri *goṇna* and in Lucknow city *chūhī*.

Besides these two common clays various districts contain special kinds. Thus in Bareilly a whitish clay used for glazed ware is called *paterī mitti*. In Benares *kandā*, a light grey clay, is made into tiles. For the ornamental ware of Nizamabad, Azamgarh, a whitish flaky clay found at the bottom of one small pond and called from the place Bhairampur *ki mitti* is used. The Chunār ware is made from two special clays called *nakli* and *khasi*; in Garhwal *chopari mati* is the name of a pink adhesive clay, and in Rae Bareilly *pindrohi* is a whitish earth. The light brittle vessels of Amroha are made from a tenacious black clay called *gwalchanā* and the porous goglets of Agra from a grey friable clay called *chīla*.

Lucknow, again, has a fine light grey clay known as *potā*, and the special clays round Naini in the Allahabad district from which jail pottery is made are *gharkoti*, *karāi* and *karbota*.

No true China clay, such as exists in a few places in the Panjāb, is to be found in the North-Western Provinces and Oudh, and the wares made are always red in colour unless glazed or painted externally.

In most districts coloured earths are smeared over even the rudest vessels to give them a brighter colour. The commonest earth so used is a rust-coloured clay which is found in every district in small pockets generally on *ūsar* or barren land. This is variously known as *kabza*, *kabizai*, *kabiz*, *kapsa* and *kabz*. In the districts lying at the foot of the Himalayas it is called *banni* or *lāl mitti*, and in Bulandshahr *jungāl kā rang*.

Besides these Meerut imports a bright yellow earth from Multān known as *multāni mitti*, and Lucknow gets from Muttra *parei mitti*, which turns a pinkish white when laked.

Section II.—By the village potter the clay is always dug out of a tank or from the common waste lands, where there are well-known patches to which he resorts with his donkey or bullock.

Cost of clay.

In Hamīrpur these patches are called *mat kha* or mud mine and in Bānda, *māi*. In the case of village potters no charge is made for this clay, as the potter in return supplies the landlords with household vessels for nothing. Town potters however have in most districts to pay for their clay, as they have nowhere a special patron from whom they can get it free. The following table shows the charges made by the owners of the land to town potters in various districts:—

Name of district.	Charge made for clay.
Jampur	Rs. 1 a year.
Fyzabad	Rs. 2 a year or for nazūl land Rs. 10 a bigha.
Benares	Annas 4 to annas 8 a month.
Mirzapur	Annas 8 a year.
Agra	6 pies a day, or Rs. 1 a year for each lion at work.
Lucknow	One anna a month. The potter may take 2 sackfuls a day.
Muttra	Annas 4 a square yard.
Farukhabad	1 pie a cart load.
Cawnpore	Rs. 2-6-0 for 100 maunds.
Auroha	Rs. 1 for 35 seers of special <i>gwalchāna</i> clay.
Kheri	Annas 8 a year for <i>kabiz</i> . This annual fee is called <i>chālī</i> .
Meerut	Annas 8 a year for each wheel.
Dehra	Rs. 1 a year for <i>lāl mitti</i> for each wheel.
Aligarh	Rs. 2 per hundred donkey loads.
Bareilly	Rs. 100 an acre is stated to be the amount received by zamindars annually owing to the great scarcity of proper clay.

Section III.—The clay is usually kept in heaps outside the potter's door for two or three days before he prepares it for use. The

Preparation of clay.

black clay is kept in one heap and the yellow clay in another. When it is thoroughly dry it is pounded with a heavy wooden mallet called *mugari* or *mongri*, and is then sifted through a sieve or osier basket known as *chalni*, *chhulnā* or *hangua*. In Farukhabad the pounded earth is sifted by being poured over an inverted *gharra*, when the coarser pieces roll far away and the fine powder falls close to the *gharra*.

In Hamirpur the sifting is done through the strings of a native bed (*charpoy*), held up slanting, while in Rampur the clay is ground in a hand-mill. The coarser pieces of earth are next put into water and left till they are dissolved, when the fine powder is added and the whole worked up into a stiff paste. This paste is now sliced either with a common sickle *hasiga* or with a two-handled bow-shaped instrument. The various names of this slicing instrument are *pa-li pa-sau*, *pauxura*, *pāsi*, *lāsū*, *laksar*, *chhilua* and *matchhēni*. In some places no slicing instrument is used, but the dough is merely kneaded with the feet or hands. During the process of kneading any substances required to alter the consistency of the clay, strengthen it, or prevent its cracking are added. Usually yellow clay is mixed with black clay at this stage in varying proportions, as black clay alone is apt to be brittle. The proper admixture is sometimes discovered by making test vessels and seeing whether they crack on exposure to the sun. In all districts wood ashes or cow-dung ashes are added to the clay both at the kneading stage and after the vessel has been shaped. This is done to prevent the clay sticking to the hand or the various instruments used in shaping it. To enable the clay to stand the heat of the kiln without cracking river sand is added to it in the districts of Budaun, Bareilly, Shāhjahanpur, Hardoi, Bulandshahr, Garhwāl, Basti, Sultānpur and Kheri. The amount of sand is in most cases about one-tenth of the whole mass, but in Basti it is stated to be as much as one quarter, and in Kheri, where the clay must be most unsuitable for pottery, fine sand is added in the proportion of one to four for common articles, and for cooking vessels the mixture is composed half of clay and half of coarse sand.

In most districts, however, where sand is not easily to be had, chaff, husks, or chopped straw are added to the clay, making about one-twentieth of the whole mass. Lucknow appears to be the only district where there is not a single instance of the admixture of either sand or chopped straw with the materials from which common vessels are made, whence it may be concluded that the Lucknow clay is especially well-adapted to the purposes of the potter. Various other substances are sometimes used for the toughening of the clay. In Shāhjahanpur and Aligarh two and-a-half tolas of cotton-wool are mixed with one seer of clay for common ware and for the Aligarh pottery known as "kankar" ware pounded nodular limestone is added. In Rampur, Hamirpur and Banda powdered horse or mule dung or rotten paper are some of the ingredients, while the makers of the Lucknow figures prepare their special paste by mashing up a half seer of *babul* tree gum, one seer of *belgiri*, half a seer of brown paper and half a seer of old cotton-wool with one seer of common black clay.

This sifting and kneading of the clay takes as a rule about three days, though sometimes one day only is spent on this work. Enough clay is ordinarily prepared at one time for the fashioning of one batch of vessels. When it is quite ready it is made up into round balls weighing from seven to twelve seers called variously *pinda*, *lounda*, *handa*, *gunā*, *gondī* and *gondā*, and is stored either inside the potter's house or in a pit about five feet in depth known as *khatta*, *bāthe*, or *ghār*. Here it is usually left for at least three days until it has lost some of its superfluous moisture, when it is ready for the wheel.

The coloured earth called *lābis* is prepared for application by admixture with the saline earth called *reh*, pounded mango bark or catechu and *babul* gum. The leaves of other shrubs are sometimes added. These are all pounded in a mortar mixed with rain water or pond water, never with well water, and left to ferment in a pot for three days. At the end of that time the muddy solution is strained off and is ready for use.

CHAPTER IV.

THROWING ON THE POTTER'S WHEEL—PRESSING IN MOULDS AND BAKING.

Section I.—All earthenware, except the very largest vessels, toys, a few ornamental wares, and some special articles, such as pipe-bowls and water goglets, are fashioned on the wheel.

The use of the wheel. The technical term for this in English is "throwing," and in Urdu *bhāṇā*, to twist round, or *chāk par goudā mārna*, to beat the clay lump on the wheel.

Section II.—Potters' wheels are of three kinds. The first, and commonest, which is found in every district, is the single wheel, *chāk*, turned by hand and supported on a wooden axis turning in a pivot fixed to the ground. The second is identical in shape with the first, but instead of resting on a pivot it has a ball of lac attached to its under surface on which it revolves. It is called *kūnda*, is turned by the hands or feet, and is peculiar to Hamirpur. The third is a double wheel fitted into a pit and turned by the feet. It is used only in Rāmpur, Muzaffarnagar and Meerut.

Potters' wheels.

(1) The common *chāk* is made either of clay, stone, or wood, most commonly of clay.

The clay wheel is made by the potter himself from ordinary black earth mixed with goat's hair, and dried in the sun. In some cases cross pieces of wood are let into the under surface of the wheel to strengthen it, and in Almora the wheel is composed of two cross boughs between which twigs are woven and tied together with ropes, the whole being covered with a thick coating of clay. The diameter of the wheel is about 3 feet and the thickness 3 inches. Its weight is about 2 maunds. In the centre of the upper surface a slab of baked clay or stone called *lāwa*, *chankheldār*, *gulbi*, *thikra mathā*, *gulwa*, or *airān* is let in. In the centre of the under side is a stone slab *gāṭhā* or *gaṭhā*. In the middle of this slab is a hole for the axle known as *guchā* or *chakothar*. The axle itself is a wooden or iron pin named *kilā*, *pānwar*, *khustī*, *killa*, *snā*, *bzon* and *dhurī*. The lower end of the axle is either fitted into a wooden block fixed to the ground or into a hole in the ground stuffed with rags. The technical term for the block is *pathari*, *pāvat*, *chaupat*, *pirhāt*, *chopat*, *chameta*. On the upper surface of the wheel are four holes near the circumference into one of which the turning stick is fitted. These are known as *guchchā*, *gulbi*, *gulla* and *chill*.

The turning stick, which is about 3 feet long has a large number of names. They are *chakrelli*, *chalākar*, *chakait*, *dāṇā*, *chiklētī*, *chiktūtī*, *chakeṇ*, *chakar matī*, *chaketa*, *chakki*, *chatki*, *changethi*, *pakhna*, *hathi*, *hathina*, *jhaganuṇī* and *jātho*.

A wheel of clay can be made in four days and costs the potter nothing. It lasts for about five years. A stone wheel, which will last a lifetime, costs on an average Rs. 4, and is usually brought from Mirzapur or Indore. A wooden wheel lasts for about ten years and is made by a local carpenter for Re. 1-8.

(2) The *kūnda* is used only by the Hundairia potters of Hamirpur, and is said to turn out coarse and misshapen vessels. It is possibly the primitive form of the wheel and as such is interesting. It is a clay disc with a slight hollow in the centre of its lower surface to which a small hemisphere of lac is attached. This hemisphere serves the purpose of an axle and revolves on a slab of stone or wood resting on the ground.

(3) The double wooden wheel consists of two wooden discs fixed two feet apart on an axle 2 feet 6 inches long. The smallest disc, about 10 inches in diameter, is that on which the clay is worked. It is called *patri*. The axle is called *masat*, and the larger disc 2 feet across is named *borā chāk*. The whole wheel is placed in a pit

about 3 feet deep, the smaller disc being on a level with the surface of the ground. The axle turns on a stone slab at the bottom of the pit, and is kept upright by a cross beam with a hole in the middle through which it runs. The worker sits on the edge of the pit and turns the wheel by pressing the lower disc with his right foot. The motion of this wheel is more even and continuous than that of the single wheel and is used for the finer kinds of pottery at Rámpur and Meerut.

Section III.—(1) The cutting string. For small vessels a lump of clay containing material enough for several articles is placed on the wheel, and each vessel as it is moulded has to be separated from the rest of the lump. This is done by drawing a string gently through the clay at the place where it is to be cut while the wheel is turning at full speed. The various terms for the string are *chain*, *chín*, *chhemu*, *chiwán*, *chení*, *dora*, and *tágá*. The string is sometimes attached to a light handle of reed known as *chábuki* or *tandsar*.

In Fyzabad, larger vessels are separated with a thick knife called *tor*.

(2) **The pestle and mallet.**—A large vessel such as a *gharra* or *hándi* is only roughly formed on the wheel, its sides being much thicker and its whole shape narrower than that of the finished vessel. The rough shape while still damp is rounded and enlarged by being beaten out with a pestle and mallet. The pestle is an earthenware disc with a round handle, and the mallet resembles a thick flat wooden ladle. The pestle is held in the left hand against the inside of the vessel, while with the mallet in his right hand the workman beats the outer surface over the spot where the pestle is held. The pestle is also used for beating out the flat bottoms of such vessels as have their parts fashioned separately.

The names of the pestle are *piudí*, *pitná*, *piur*, *petri*, *pino*, *beniar* and *kúndari*. Those of the spoon-shaped mallet are *thápá*, *thápi*, *thopni*, *thapara*, *thopu*, *dabio* and *pitan*.

(3) **The rest or support for unbaked vessels.**—While the vessel is being shaped as described above, it is held up in a rest which is usually the semicircular half of an old *gharra*, but is sometimes the thick basin called *kúnda*, or *kúnd*, and sometimes a specially prepared hollow earthenware cone. This is called *ánthra*, *athri*, *chin* or *gadhut ka kúnda*.

(4) **The water-jar** is kept by the side of the wheel, and the potter continually wets his hands in it as he works. The cutting thread is always kept soaking in this jar, which is called *chakhouri*, *chalounsi*, *perhera*, or *khol*. The yellow clay used for small articles is also usually kept wet in the water-jar. In one or two districts a basket of sand stands near the wheel for the potter to dry his hands in when necessary.

(5) **The slab.**—Before being placed on the wheel the prepared balls of clay are brought out and kneaded together on a stone or wooden slab called *patri*.

(6) **Polishing and scraping instruments.**—Pipes, bowls, goglets and a few other articles are polished and scraped before being baked after they have dried for a few hours. For this purpose they are fixed a second time on the wheel, which serves the purpose of a turning *lathe*. The commonest scraping instrument is a hollow hemisphere of iron with a circle cut out of its bottom. Both the edges of this circle and the rim of the hemisphere itself are applied at various times to the outside of the vessel which is being polished. This instrument is in most districts called *káuria*, but is also known as *sinkar*, *pára*, *pochára* and *sutohí*.

Besides this an iron blade called *chelni* or *childi* is often used. After the scraping the final polish is given by pressing against the revolving vessel either an earthen cup (*pariya*) a shell (*sippi*), a stone (*ghont*), a peeled stick (*karkat rainsár*) or a piece of cloth (*patla, patait, patiait, patigawat*).

(7) *The designing chisel*.—Incised ornamentation and lines are produced by drawing on the unbaked vessel with a thin pointed chisel called variously *bhúnti, naqqáshi, chuiha, kuchi, chulla, kutni, niharni, kainchná*. A sharp pebble, *mankir*, is sometimes used instead.

(8) *The brush*.—The reddish coloured earth *kabiz* is applied to all vessels made by throwing with a brush *qalam* or a rag.

Section IV.—(1) *A gharra, hándi* or other big vessel is made as follows:—

Method of manufacture. The potter takes his lumps of prepared clay out of the pit where they have been drying for two or three days, kneads them together on the slab, wets his wheel, and places about 3 seers of the clay on the earthenware centre. Then he starts the wheel with his hands, takes up the turning stick, and deftly fits it into one of the holes on the circumference of the wheel as they pass round. Grasping the upper end of the stick with his right hand and the lower with his left, he gives it a few vigorous turns, and the wheel is set spinning so evenly and steadily that it will show no signs of falling for at least five minutes. He now throws aside his stick, squeezes the lump of clay with both hands, and thus twists it into a short spiral mound technically known as *jár*. Into the centre of this mound he plunges his right fist until he has made a hole, into which he inserts the thumbs of both hands and presses outwards with the ball of each thumb in opposite directions until he has produced a symmetrical basin in the top of the stand of clay. Then he stretches his fingers down the outside of this basin and pulls up the rim evenly all round, gradually narrowing the diameter: during all this operation his hands have been continually moistened in the water-jar. The rough shape of the vessel is now revolving on the top of the pillar of clay. The potter takes the cutting string from the water-jar, and separates this rough shape called *bát* from the pillar. The result is a cylinder of moist clay slightly bulging in the middle and without a bottom. Some workmen however by applying the cutting string lower down the clay pillar secure a bottom to the rough shape. The practice differs in different villages and depends on the tenacity of the clay.

This cylinder is placed in the earthenware rest and left to dry for 24 hours. It is then taken out of the rest and placed on a board, and its bottom is filled in on this board with kneaded clay, manipulated by the potter's fingers. Cowdung ashes are now sprinkled over the whole vessel and it is beaten out with the pestle and mallet. When the final shape has been arrived at, the vessel is set aside to dry for another period of two days. It is then brought out again and a solution of common yellow earth is spread over it with a rag. This process is called *minj*. The vessel is now once more dried for 24 hours and then a solution of the rust-coloured earth *kábiz* is applied to the upper half with a brush or rag. It is next set aside for a final drying of two days, and is then ready for the kiln. The whole process of preparing a *gharra* for the kiln thus takes about seven days.

(2) *The hugga* or pipe-bowl for water is made as follows:—

The potter takes a small quantity of prepared clay and pestles it out on a tile sprinkled with ashes into a thin disc. This disc, which is to form the flat bottom of the *hugga*, is called *pendá*. The potter now puts some clay on the wheel, sets it spinning, and works up the clay into the shape of a solid wide-mouthed squat jar, which is not to be made into a vessel itself but to serve as a stand for the *hugga* during its

making. This stand is called *pind*. The pestled disc is set on the top of this jar-shaped revolving erection of mud, and a handful of clay just enough for one *hugqa* is taken out of the water-jar, placed on the disc and drawn up into the shape required beneath the tender fluttering of the potter's fingers. The soft *hugqa* is dried in the sun for a day and is then ready to be polished. For the polishing process instead of the jar-shaped stand used in the fashioning of the vessel a cylinder of dried earth about 1 foot high called *kúnda* is fixed to the wheel with moist clay, and the rough *hugqa* is fixed to the top of the cylinder in the same way. The wheel is set in motion and the surface of the *hugqa* is first scraped with one of the scraping instruments described, and then polished with a smooth stone, shell, or piece of glass. It is then handed over to the potter's wife, who makes incised patterns on it with the designing chisel. The *hugqa* is now ready to receive a coating of coloured earth or to be painted, and the other stages are the same as those necessary in the case of a *gharra*.

Section V.—There are three kinds of moulds. The first is the mould on the exterior of which big water-troughs and flower-pots are roughly shaped. The second is a hollow mould in which certain vessels are made in two separate parts afterwards joined together. The third is the mould inside which raised patterns and shapes are made.

The first kind of mould is an egg-shaped or dome-shaped earthen vessel somewhat resembling the *mát* or *muká*. It is called *anthúra*, *unir*, *gota*, *bát* and *sáncá*, and is used in every district.

The second mould is used only in the districts of Fatehpur, Fyzabad and Almora. It is a thick basin called *palí* or *sáncá*.

The third mould is made in two halves for toys, by plastering clay on a model of the article to be made and then detaching it in two portions, each having gained a reverse impression of the shape required. For a flat ornament, such as a leaf or flower which is to be attached to the outside of a vessel, only a single half mould is of course needed.

The third kind of mould is called *khapra* or *sáncá*. All these moulds are made by the potters themselves, except in the case of the ornamental pottery of Chunár, where moulds of cane-work patterns are made by *khatiks*, who do cane-work.

Section VI.—(1) The egg-shaped mould *anthúra* is used in the following way. The potter first sprinkles sand or fine wood ashes over the whole of its surface, spreads clay all over it with his hands, and beats it well down with the pestle. The mould with the clay spread over it is allowed to stand for about three hours in the sun, and the mould is then pulled out of the clay case by two men, one holding the clay and the other drawing out the mould by its mouth, which is held down towards the ground.

The opening in the clay through which the mould is pulled is of course greatly enlarged by the passage of the mould and the result is an irregular oval vessel with a wide mouth. This is beaten into shape with the mallet and pestle as is done with large wheel-made vessels, and is then put to dry in the sun with two sticks set across its mouth to prevent contraction. A wisp of grass is also sometimes tied round its circumference to hold it well together.

(2) The use of the second kind of basin-shaped moulds is different in Fatehpur and Fyzabad from that obtaining in Almora. The only articles fashioned in them are apparently the *badhna*, or spouted vessel for ablutions, and the *suráhi* or water goglet. A lump of clay is pestled out flat and then pressed into the shape of the mould with the potter's fingers. The resulting shape forms the lower half of the vessel. The upper half is made by pressing a pestled strip of clay round the inside of a second

mould exactly resembling the bowl-shaped mould, but without any bottom. The two halves are then joined together with moist clay, and for the *badhna* a spout is added.

In Almora the Hankia potter sits down by the bowl-shaped mould and continually moves it round with his toes, while he flattens the clay all over the inner surface with his fingers, gradually building it up to the rim of the mould by the addition of small pieces of clay. Then still twirling the mould with his toes, he smooths the clay with a wet cloth, and finally shakes it out of the mould. The result is the lower half of the vessel required. The upper half is made in the same mould as the lower half, the clay being spread round the sides only and not over the bottom of the mould.

(3) The use of the third kind of mould in which the trunks of figures and raised ornaments are made does not need description. The interior is sprinkled with sand or ashes in all districts except in Bijnor, where for coloured ware the clay is put into fine muslin and thus prevented from sticking to the mould.

Section VII.—The kiln for common red pottery and the coarser kinds of coloured

The kiln for common wares.

wares is called *āwā* everywhere except in Garhwal where it is known as *aurh*, and in Benares where a small kiln for a few vessels is called *kaur*. It consists of a circular pit about 3 feet deep and about 8 feet in diameter. At the bottom is always left a layer of the ashes of former bakings about 3 inches thick. On these is set a layer of cowdung cakes and above this alternate layers of vessels and cowdung cakes, each successive one of which lessens in diameter, so that the whole pile is shaped like a cone. The unbaked vessels are always placed with their mouths downwards slightly inclining towards the centre, and are built up round two bottomless *ghorras* placed one above the other in the centre, to serve as a chimney. This rude chimney is called *dhuani*, *dhuārā* or *nār*. The whole cone-shaped pile is covered over first with cowdung, then with straw, and last of all with clay. Several holes are pierced in the covering all round the kiln near the ground, a smouldering piece of cowdung is dropped down the chimney and the furnace becomes lighted and burns itself out in about 24 hours in the hot weather and in about 36 hours in the rains. In tracts where wood is cheap it is used instead of cowdung, and at certain times of the year mango leaves and sugarcane leaves are burnt. When the fire has burnt itself out the potter waits until it is quite cool, which is usually after 12 hours, and then opens the kiln. For the purpose of colouring vessels black a different process is followed, which will be described in connection with coloured wares.

There are generally three bakings a month during the hot and cold weather, and at each baking about 300 large vessels and 600 small ones are turned out. The fuel for each baking costs about Rs. 3 and the loss by cracking varies from 5 to 75 per cent.

Section VIII.—The kiln for the baking of finer wares and glazed pottery is

The kiln for fine wares.

universally called *bhatti*. It is a cylinder about 5 feet high built either of bricks or clay and divided into two stages by a pierced flooring of clay, or as at Aligarh of perforated iron. There is a door for both stages, the upper of which holds the articles to be baked, while the lower is the furnace. Common glazed wares, such as *chilams*, are all stacked together in the upper stage, while the more delicate kinds are in most cases stood upon stools or tripods of baked clay called *tirkaliya*. In Rāmpur, articles "of improved English design" are placed in baked fire-clay vessels called *kolabds*, and in Meerut iron stands called *khara* or *samha* are used. In Aligarh, besides tripods, the halves of old vessels are used to keep the different articles separate from one another.

When the upper stage has been filled, it is roofed over with round earthen platters and the fire is lighted. The fuel is always either wood or the stalks of various crops such as hemp and indigo. The fire is put out after about 24 hours and the kiln is allowed to cool for 6 hours, when the vessels are taken out.

CHAPTER V.

UNGLAZED COLOURED POTTERY AND GLAZED POTTERY.

Section I.—(1) Black. *Chilams, haqqas*, drinking vessels and oil vessels are to be found coloured jet black in almost every district. This colour is produced by causing some oily or resinous substance to thoroughly permeate the

Burnt colours.
clay and then hermetically sealing the kiln so as to force the smoke to deposit its carbon in the oily cells. For this purpose the vessels to be baked are commonly smeared with mustard or linseed oil and a large quantity of straw, chaff, powdered goat's dung and the husks of oilseeds is mixed with the usual cowdung fuel to produce a more copious smoke. In the Himalayan districts all vessels are coloured black by throwing in pine bark when they are half baked. After twenty-four hours the kiln is usually cooled with water. Owing to the presence of the oil with which they are soaked black vessels are stronger than the common red ones and hold liquids much better.

In the case of fine wares two or three articles are put into a big jar together with straw and oilseed husks, the jar's mouth is sealed with clay, and the jar itself put into the kiln with other kinds of vessels. The heat of the fire outside the jar chars the materials inside it, and produces a smoke in the jar without the articles which are to be coloured being in actual contact with the flames. In Bareilly and Meerut an inferior black colour is produced by smearing the unbaked vessel with lamp-black mixed with gummy water.

The black colour of the patterns drawn on all household vessels used by the Hindus of the northern districts is produced by grinding up blackish pebbles in a hand-mill, mixing the powder with gum or paste, and applying it to the unbaked vessel with a brush. The mixture is dark-brown before baking and turns black under the action of the fire.

(2) *Terra-cotta*.—In Azamgarh and Lucknow a dark terra-cotta tinged with apricot is produced by smearing the unbaked vessels with the rust-coloured earth *kabiz* mixed with sweet oil. This colour is far richer than that of the common *kabiz* which has been already described. In Azamgarh it is used as a background for patterns of silver foil, and in Lucknow for white patterns. At Agra and Chunar very much the same tinge is obtained from a kind of red stone ground up and mixed with paste.

(3) *Salmon colour*.—This colour is produced by the application of red ochre mixed with *babul* gum before baking. The red ochre costs 2 annas a seer. Town potters colour even the commonest vessels with red ochre at the end of the hot weather when the rain or pond water necessary for the application of *kabiz* cannot be had.

(4) *Plum-colour*.—This is a favourite colouring for *haqqas* at Lucknow. It is made of *kharya mitti*, a kind of pipeclay, mixed with *hirmanji*, a coloured earth, in the proportion of one to two.

(5) *Pinkish white*.—This is made from an earth called *parei mitti*, which is of a silvery appearance before being baked, is imported from Muttra, and sold for Rs. 3 a seer. It is generally used to pick out patterns on other colours.

Section II.—With the exception of the wares peculiar to Lucknow, Amroha, Gonda and Sitapur, no earthenware vessels appear ordinarily to be painted after they have been baked. The toys and rude figures of the gods however, which are made in every district, are always painted with the gaudiest colours imaginable. Before receiving the colouring the toy is always smeared over with a mixture of chalk and gum or paste.

The following colours are those most commonly applied :—

- (1) *Red*.—From red lead, selling for 6 annas a seer, or from red ochre, at 1 pie a seer.
- (2) *Yellow*.—From turmeric at 5 annas a seer, or from *peori*, cow's urine, dried and powdered at 3 annas a seer, or from *kartál*, sulphate of arsenic, at 8 annas a seer.
- (3) *Blue*.—From indigo at 8 annas a seer.
- (4) *Green*.—From verdigris at 6 pies a tola.
- (5) *Cream-coloured*.—From a substance called *sanila*.
- (6) *Purple*.—From English aniline dyes.
- (7) *Silvery white*.—From mica, *abrakh*.
- (8) *Gold and silver tinsel and amalgam of mercury*. All these colours are mixed with gum or paste and applied with a horsehair brush.
- (9) *Gandabiroza* is a varnish made from the resin of a certain pine and mustard oil. It is applied to nearly all toys over the other colours.
- (10) *English varnish* is rubbed over the ornamental plates made by Durga of Lucknow.
- (11) *Red lac varnish* is applied to the long jars called *amritbans* used for keeping tobacco or pickles, and also sometimes to *kándís*. In most districts the Lakhera caste monopolizes the trade; but in Kheri it is in the hands of *manihars*, the makers of lac and glass bangles; and in Fyzabad the potters who apply lac varnish are of the sub-caste of *kumhars* called *dillindál*.

Section III.—The art of glazing is known in sixteen districts, though in many of them it is practised on a very small scale. Metallic glaze is applied in Benares, Lucknow, Meerut, Mirzapur, Farukhabad and Fyzabad. Vitreous glaze is applied in Agra, Allahabad, Aligarh, Budaun, Bareilly, Benares, Bulandshahr, Farukhabad, Fyzabad, Lucknow, Meerut, Moradabad, Mirzapur, Muzaffarnagar, Pilibhit and Rámpur. The trade is in most districts in the hands of *kasgars*, but is carried on in Budaun by *manihars*, in Muzaffarnagar and Rámpur and Meerut by *multáni kumhars* and in Chunár by *khattris*. In Allahabad glazed pottery is made in the central jail, but no account has been received of the process of its manufacture.

Section IV.—Metallic glaze is made in three colours,—yellow, green and red.

Metallic glaze, its ingredients, preparation and application.

- (1) *The yellow glaze* is made as follows:—Lead and zinc in the proportion of one to eight are put in an earthen pot which is set over a clay hearth and plastered round with mud. They are melted up for two days, and the white scum containing the oxide of the two metals combined, which is called *phál*, is continually

skimmed off with a large flat ladle called *kalchul* or *karcha*, one-eighth part of borax and one-eighth part of powdered red stone are then added, and the compound is again melted up for about seven hours. At the end of this time the molten mass is poured slowly into a wooden trough full of water and coagulates at the bottom of the trough into separate pieces, which are at once taken out and ground to powder in a common stone handmill. This powder is mixed with very thin wheat-flour paste and is then ready for application to the vessel.

(2) *Green metallic glaze* is produced by the addition of one-eighth part of copper dust to the ingredients of the yellow glaze.

Green and yellow metallic glaze are made in all the above-named districts.

(3) *Red metallic glaze* is made only in Fyzabad and Chunar (Mirzapur). In Fyzabad it results from the addition of a small quantity of red oxide of mercury to the yellow glaze, and in Chunar, as far as could be discovered, from an admixture of quick-silver with the same.

Metallic glaze, unlike vitreous glaze, is applied to the ware after the latter has undergone a baking of about seven hours. It is either applied with a brush, or the whole article is dipped into the basin of glaze. It is allowed to stand for about 3 hours and then put back into the kiln and baked for six hours. Metallic glaze is never used for delicate ornamentation and is only applied to pipe bowls, the spikes, knobs, and classic vases with which native houses built in a debased renaissance style are adorned, and the pierced screens through which secluded ladies are allowed their only glimpses of the world.

Section V.—The main ingredient in vitreous glaze is the native glass or *kanch*.

Vitreous glaze, its ingredients, and application. This is usually obtained in the form of broken glass bangles from the bangle-sellers at about Re. 1 a maund.

The bangles are ground up into a powder in a hand-mill and mixed with wheat flour or rice paste. The glaze thus obtained is of a greenish white, and is spread over whatever colour the article to be glazed has received before baking. The only colouring matter which is ever mixed up with the glaze before its application to the vessel is powdered copper, which turns blue when baked. In the case of all other hues the colouring material is first applied, and the colourless glaze spread over that to fix and protect it. The colours usually obtained are as follows :—

White from chalk and gum, except in Rámpur, Budaun, Bulandshahr and Meerut, where powdered white stone and paste are applied.

Red is obtained in most districts by merely spreading the transparent glaze over the uncoloured red surface of the common ware. But in Bareilly borax and red lead are applied and in Rámpur a red earth called *bamri*.

Dark green from powdered copper and borax.

Light green in Lucknow from powdered iron refuse.

Yellow from red stone, zinc and lead melted together and then powdered.

Orange at Bareilly and Benares from *hirmanji* earth.

Blue from indigo at Rámpur, from *senta* stone at Meerut, oxide of manganese and borax at Budaun, calcined copper and chalk at Lucknow. All the coatings which a vessel receives from the glazer, including the colourless glaze itself, are technically known as *nishasta*, which has been corrupted in most districts into *nastar*.

After the vessel has been painted, either by the potter himself or, in the case of fine pottery, by a professional painter, the glaze is allowed to dribble over it from a cup or saucer, or is splashed over it by the potter with his hands. The vessel is then

dried for one day, and baked in the kiln specially used for glazed pottery and already described. Vitreous glaze is applied to pipe-bowls, the saucers, cups and basins used by Musalmáns, and to all ornamental glazed wares.

CHAPTER VI.

ORNAMENTAL WARES.

Section I.—The Chunar pottery is quite distinct from any other kind produced in these provinces. Its colour is a dark brown, approaching, when glazed, to black, and is apparently due to the use of the special clays noticed in the second chapter. The ornamentation and shape of the wares is purely English and generally classic in character. It consists mainly in raised leaf and flower patterns made in moulds, the manufacture of which has been hereditary among certain families of kahárs for many generations. A basket pattern ware is made by the same kahárs in moulds which they buy from cane-weaving khatiks. The articles made are sold both glazed and unglazed. The art of glazing was introduced 22 years ago by one Bacha, kahár, who had learnt it at Bombay. It is probable, though this is not stated in the report received, that the same Bacha is responsible for the feeble and debased European ornamentation now characteristic of this pottery. In the whole range of patterns, which is very large, there is hardly one to be seen bearing any traces of oriental origin. This unfortunate tendency has attracted or perhaps resulted from the patronage of that large class of natives who prefer European to Indian articles, and of that still larger class of Europeans who, without the faintest understanding of the characteristics of oriental design, buy up eagerly anything produced in Asia under the delusion that they are investing in high art. The export trade in this ware is consequently larger than that of any other produced in these provinces.

Section II.—The Azamgarh pottery is a black and reddish brown ware ornamented with designs in silver foil. The black and reddish brown are burnt colours produced in the manner described in chapter IV, section I. After the baking, silver foil or an amalgam of mercury and tin is rubbed with the thumb nail into lines etched with a sharp instrument on the unbaked ware. The case of this pottery is nearly as hopeless as that of Chunar. The potters, who retained until the beginning of the century the traditional designs which they brought with them from Gujarát, have now been taught a Grecian style from which they cannot free themselves. It is faithfully described by Sir George Birdwood in the following words: "The Azamgarh pottery, like most of the art-work of the Benares district, is generally feeble and rickety in form and insipid and meretricious in decoration, defects to which its fine black colour gives the greater prominence." Further on he talks of "the characteristic mawkish and forbidding effect, which however the unsophisticated potter of Azamgarh does not attempt to mystify by calling it by any of those artful advertising cries wherewith so much ado about nothing is sometimes made in English high-art galleries."

The articles produced are chiefly teapots, sugar-bowls, candle-sticks, vases, and the like, the price of which is very moderate; two large milk jugs, for instance, selling for 7 annas, and a flower vase for 10 annas.

Section III.—The ornamental pottery of Lucknow is of four kinds :—

Lucknow pottery.

(1) Goglets, plates, cups and saucers ornamented with simple designs in bright unglazed colours, the background being usually blue, plum-coloured or salmon-coloured, and the patterns white. They are very little bought by Europeans, but have a great sale among natives through the whole of the north of India and especially in Oudh.

(2) Trays, plates and vases painted with varnished colours, the background of red ochre, gamboge, aniline purple or cochineal and the designs in white lead, solder or native ink. The effect is brilliant and bizarre and the patterns attractive. The centre is generally filled by a drawing of a mosque or fountain surrounded by palms, while the edges are covered with twined leaves and flowers, the whole being protected by a thin coating of varnish which almost gives this ware the appearance of glazed pottery. The system of colouring is peculiar to Lucknow and to one family of potters. The annual outturn is considerable and is bought chiefly by the English visitors to Lucknow.

(3) Models of fruits and vegetables :—

These models are at once the cheapest and best of all those made in India, being acknowledged superior to those of Krishnagar and Poona. Every conceivable fruit and vegetable is imitated, from a huge bunch of plantains or a jack fruit to a dried onion, and the colouring is very realistic. The larger fruits are strengthened by stout wire introduced into the stalks. The whole fruit is modelled by the potter by hand, and after being baked, receives four or five coatings of the chalky earth called *kharya mitti* and over that the colouring. These models are exported chiefly to Bombay and Calcutta, where they appear to be largely bought at local fairs and exhibitions. The great excellence of the modelling and colouring being considered, their prices are low. A big bunch of plantains sells for Rs. 8, a stick of sugarcane for Rs. 5, a pineapple for Re. 1, and oranges, onions, &c., for Rs. 6 a dozen.

(4) Lucknow figures :—

These celebrated figures differ from, and are superior to, those of Krishnagar from the fact that the modellers do not use actual hair, wool, pieces of clothing and other accessories for their decorations, but use clay instead, which gives them greater durability.

The larger figures are realistically coloured, while the smaller and cheaper ones are coated with red ochre which when dried presents the appearance of Italian terra cotta. The composition of the clay used has already been described. Moulds are used for the trunks of the figures alone. The artists model the head and face, the curves of the body and the limbs with their fingers and a graving tool. Mohan Lal, a thákur by caste, the best worker at present in Lucknow, goes out to study his subjects every evening in the bazár, and has amassed an immense amount of knowledge as to the facial characteristics of every class of man. He can tell any one's caste and country at a glance. Before the invention of photography his family was chiefly employed in modelling terra cotta busts of the Europeans of Lucknow, and an excellent likeness exists of a late Judicial Commissioner, but since the introduction of photography this branch of the art has almost fallen into disuse. The most famous living representative of this family is Gulab Dass, who made the wonderful model of the Aminabad Bazár, now in the Lucknow museum. He has now entered the employment of the Nizam of Hyderabad, and the modellers left in Lucknow are confessedly his inferiors.

These figures are very cheap. Their price varies with their height and is on an average Rs. 13 a dozen.

(5) Besides these ornamental wares, glazed tiles, flower-pots, and vases of a most artistic kind were made in Lucknow till ten years ago, when the potter died without

having initiated his sons into his secrets. The tiles were absolutely unique, containing a great variety of pale purples, greens and blues, such as are not to be met with in any other Indian ware. Specimens may still be seen in the courtyard of the potter Ghulab, who shows a medal won by his father at the Colonial and India Exhibition. It does not speak well for the artistic perceptions of the inhabitants of Lucknow that this art was so little encouraged.

Section IV.—This glazed pottery, which is properly called a faience, has a red earthen body covered with an opaque white enamel, in which flint is a large ingredient, painted chiefly in dark blue and turquoise, but sometimes in claret colour, or yellow. The designs, which are strictly conventional, are drawn by artists who receive from 8 annas to Re. 1 a day. This ware is the most effective of the various kinds manufactured in the provinces and owes much to the interest taken in it by the late Mr. Growse and His Highness the Nawáb of Rámpur. In style it resembles almost exactly the ware of Multán, whence its manufacture was originally introduced.

Balandshar, Meerut and Rámpur pottery.

The Rámpur ware is cheaper than that of Balandshahr. A Rámpur *surdáhi*, for instance, selling for Re. 1, while a Bulaudshahr *surdáhi* sells for Rs. 2-8.

Section V.—This is a peculiar, thin and brittle ware, coloured white and ornamented in colours and in gold and silver leaf. The lightness of the ware is due to the special qualities of the clay of which it is made. Before baking, the vessel is covered with a coating of *khargá mitti*. For the application of the gold and silver leaf the pattern is broadly marked in wax and the leaf put on over this. This ware formerly enjoyed a certain reputation in Europe, won by the quaint effect of its colouring and shapes. But the whole trade is now affected by foreign shapes and names, and the recent great decline in the exports is attributed to this fatuous imitation.

Amroha pottery.

Section VI.—This pottery resembles that of Chunar in style. The ornamentation is European in character, consisting of fruits and flowers in relief, which are impressed in moulds and affixed to the surface of the pottery before baking. The ware is coal-black and slate coloured, and the main ingredient is kankar, carbonate of lime. The art was introduced or invented about twenty-two years ago and it is to be hoped that it will die out with its introducer, as it can only injure the reputation of Indian artists. There is practically no sale for it, except at exhibitions and agricultural shows, the promoters of which have mistakenly encouraged its manufacture.

Aligarh pottery.

Section VII.—At Atraula in Gonda and at Biswán in Sitapur, *gharras* and other common vessels are painted by local artists or kamangars in flower patterns. The designs have been entirely unaffected by European influences and are consequently uncommon and delightful. The ground is usually a dark green and the flowers are painted on this with great skill and brilliance. Fortunately for the artistic prospects of this ware, it is not regularly exported and is chiefly manufactured for presentation purposes. If it were brought to the notice of Europeans, the demand for it would certainly exceed the supply and the quality of the work would deteriorate.

Pottery of Gonda and Sitapur.

Section VIII.—Pottery of a peculiar glaze used to be manufactured in considerable quantities at Dewa in Bara Banki. Specimens of it were exhibited at the Calcutta International Exhibition of 1883 and the Glasgow International Exhibition of 1888, and received favourable notice; the two potters, who kept the secret however, died two years ago and their sons have

Extinct ornamental wares of Bara Banki and Saháranpur.

taken to agriculture. The pottery seems to have been purely oriental in style and delicate in design; resembling true porcelain more than any other wares produced in these provinces. It is a pity that it was not more encouraged, and as the death of the potters occurred so recently it is probable that their sons still have the secret and that the industry might be revived. A glazed ornamental ware decorated with heavy gilding and glazed tiles were until recently manufactured at Sahāranpur. They also have disappeared from lack of encouragement.

CHAPTER VII.

THE POTTERY TRADE, BY WHOM CARRIED ON, AND THE PROFITS OF ITS VARIOUS DIVISIONS.

Section I.—The manufacture of earthen articles is confined more strictly than many other Indian trades to one caste, that of the

The potter, his caste and social status. *kumhar*, Sanskrit kumbha-kāra, a maker of jars.

But in a few districts other castes engage in the trade. In Chunar, in the Mirzapur district, kahārs make the vessels and khatris do the glazing. In Garhwal and Almora handkiya, or vessel making doms, are almost the only potters. In Hamirpur, mochi women make rude earthenware toys and images of the gods, and in Lucknow a family of thākurs keep the manufacture of the famous Lucknow figures almost entirely in their own hands.

The true kumhars are naturally Hindus. Their number in these provinces at the census of 1891 was 702,895, and they were found to be divided into 773 endogamous sub-castes. The most important of these were the *bardiya*, those who carry their clay on oxen, the *gadhaiya* or *gadher*, who carry their clay on donkeys, the *ch-khais* or the *bais* of the wheel, the *gola*, who make round vessels, the *kumaiya* from Kanauj, the *mathuriya* from Muttra, the *mahār* and the *kasgar* or goblet maker. For all practical purposes, however, it appears that the common usage of the general public is to divide Hindu kumhars into two classes, the *bardiya*s or drivers of oxen, and the *gadhaiya*s or drivers of donkeys, and to include all Musalmān potters under the designation of *kasgars* or goblet-makers. There are various traditions of the origin of Hindu kumhars. According to one, they are born of a vaiśya woman by a brāhman father. According to another the father was a malakara gardener, and the mother a chamār: while a third states that the ancestor of the caste was begotten of a telī woman by a *patlikara* or weaver of silk cloth; one sub-caste the Chauhāniya misr, claims to be descended from a kshatriya mother and a brāhman father.

The social status of a kumhar is very low; but the bardiya are far more highly thought of than the gadhaiya or keepers of donkeys. As an instance of this it is noted in the Shāhajānpur report that brāhman *gurus* will eat bread in the house of a bardiya, but not in that of a gadhaiya. In all their domestic ceremonies and practices kumhars differ very little from other low castes. They practice when possible infant marriage and they marry as a rule only one wife, whom they may divorce by the ceremony of breaking a tile with their foot before the council of the brotherhood. They allow the remarriage of widows and cremate their dead.

As to their religion, their deities are the Panchon Pir, whom they worship in the months of Kuār and Baisākh; Bhāwani; various village godlings; and Hardaur Lāla, the patron of cholera, who has become among them a regular household god, and whom they worship in the months of Kartik and Baisākh.

The kumhār is peculiar for the peaceableness of his disposition. He very rarely comes into the courts, but prefers to settle his disputes in a council of his brotherhood.

Musulmān potters, roughly and inaccurately called *kasgars*, numbered 10,189 at the last census and are divided into 52 sub-castes. They are confined chiefly to

the Meerut and Rohilkhand divisions, the largest number, 2,550, being found in the district of Bijnor. In Oudh the only districts containing a considerable number are Lucknow and Bara Banki. Their circumstances present no feature of interest.

Section II.—Of the whole number of persons returned as kumhars, Hindu and Musalmán, at the census of 1891, it appears that

The proportion of kumhars actually engaged in pottery.

about one-third have entirely abandoned the manufacture of earthen vessels and taken to agriculture.

A large number also combine agriculture with the practice of their proper profession. The census returns show that out of 712,994 kumhars only 466,390 are makers of earthen wares, and that out of these 159,484 persons, or more than one-third, combine pottery with agriculture. Those kumhars who do actually engage in pottery may be divided broadly into town potters and village potters. The conditions of life and methods of trade of these two classes are entirely different.

Section III.—The town potter is an independent man, renting his own house,

The town potter, the division of his trade, and the profits of each division.

paying for the clay which he uses, and asking a fixed price for his vessels, which he generally sells to a wholesale merchant or to a travelling pedlar.

He usually has no land of his own to cultivate and so has to depend entirely upon the sale of his pots. This being the case, he is unable to give up his pot-making during the three or four months of the rainy season and is forced to have his kiln under shelter. In some towns he supports himself during the rains by acting as a carrier, especially of manure, using his bullocks or donkeys for that purpose. But in most towns he either manages to bake under cover or he stores up a large number of articles for sale during the rainy season. In Dehra Dún a potter always sells firewood and falls back upon this trade when his kiln cannot work.

No pottery business in the whole of these provinces is considerable enough for the employment of hired labour. The average family consists of a father, two sons and one or two women. The men employ themselves in fashioning the vessels, while the women ornament them with lines and tracery, colour them sometimes when this is required, and take them on their heads for sale.

For the purpose of the calculation of their profits, town potters fall into three divisions; 1st, the makers of glazed pottery; 2nd, the makers of unglazed coloured ornamental pottery and toys; 3rd, the makers of common red pottery.

(a) Glazed pottery is made in fourteen districts, always by town potters. No details are given upon which a calculation of profits can be based, but the general estimate seems to be that a flourishing workman can make about Rs 350 a year. The following is the result of calculations carefully made in Lucknow with regard to the trade of one of the chief makers of glazed pottery :—

	Rs.	a.	p.
Fuel for one baking, 7 maunds mango wood	2	0	0
Clay and carriage	0	12	0
Ingredients for glaze and fuel for melting it	6	0	0
Result of one baking 1,350 vessels of different sizes at cost of	8	12	0

These vessels sell as follows :—

	Rs.	a.	p.
800 glazed chilams sold five for one anna	16	0	0
650 glazed banisters, spikes, &c., at average price of Re. 0 1 2 each	60	10	0
Sale value of 1,350 vessels	70	10	0
Deduct 10 % for spoiled articles	7	0	0
Total amount realized	63	10	0
Profits on one baking	54	14	0

There are seven bakings in the year and the net annual profits of an especially prosperous maker of glazed pottery are therefore about Rs. 384-2-0. In Bulandshahr the annual profits of a maker of glazed ornamental pottery are estimated to be Rs. 450, and at Chunar, Mirzapur, Rs. 365. At Meerut three or four makers of glazed pottery pay income tax; but this is an exceptional case.

(b) Coloured unglazed ornamental articles are made in nine districts. The profits of the most flourishing manufacture of these goods in Lucknow have been calculated as follows :—

	Rs.	a.	p.
Fuel for one baking	2	0	0
Clay and carriage	1	0	0
Colouring for 1,620 articles, 34 seers, at four annas a seer ...	9	8	0
Total cost price of 1,620 coloured articles ...	11	8	0

The actual number of articles put into the kiln at one baking is 1,800, but 10 per cent. are always spoiled.

In each 100 vessels made are :—

	Rs.	a.	p.
20 huqqas, plain pattern	0	3	3
20 huqqas, better pattern	0	6	5
20 surahis at Rs. 1-8-0 a dozen	2	8	0
40 milk jugs, teapots, &c., at annas 8 a dozen	1	10	8
Total selling price of 100 articles ...	4	12	4
Total selling price of 1,620 articles ...	76	5	4
Profits on one baking	64	13	4

This potter turns out and sells to wholesale dealers seven batches in the year. The net annual profits of a flourishing maker of unglazed coloured ornamental pottery are therefore about Rs. 453-13-0. He is nearly always a Musalman potter or kasgar. In his monograph on the trades of Lucknow Dr. Hoey gives the profits of a kasgar as Rs. 2-2-0 on every Rs. 6-14-0 of goods which he sells. If this calculation is correct, the profits on each batch would be only Rs. 24, and the annual profits only Rs. 168. But the basis for this estimate is not given, and the profits of a flourishing kasgar are probably more nearly those given above.

(c) The estimates of the annual profits of a maker of common red pottery vary from Rs. 30 to Rs. 200. Careful inquiries made at Lucknow show that the average family of city potters, consisting of two men and a woman, can turn out a miscellaneous batch worth Rs. 3 in six days. If the woman is excluded the earnings of the two men, after deducting cost of fuel, are 6 annas a day; common red pottery can, unlike the coloured and glazed kinds, be turned out under cover all the year round. The annual earnings of a city potter making common red pottery are therefore about Rs. 69.

Dr. Hoey gives the following estimate of his profits :—

Wheel-made articles.

In Rs. 14 realized by sale of gamias	Rs. 5-1 is profit.
" " 4 " " gharras	" 1-6 "
" " 2-4 " " handis	" 0-14 "

Moulded articles.

In Rs. 12 realized by sale, ghunglis, nals and tiles	Rs. 4-4 is profit.
" " 27 " " " " bricks	" 8-8 "

Hand-made articles.

In Rs. 8-6 realized by sale of milk pans, nānds, &c., 3-6 is profit.

Section IV.—Glazed pottery and unglazed coloured pottery is invariably sold to the public by retail dealers and travelling pedlars who buy wholesale from the potters. They sell at a profit of about 56 per cent., coloured *sardhis* for example being bought by them for Rs. 2 a hundred and sold to the public for 6 pies each. It is impossible to estimate their annual profits accurately.

Common red pottery is usually sold to the public retail by the city potter himself. But tobaccoconists buy *huggas* and *chilams* wholesale and sell them retail, and in some districts, such as Aligarh and Bareilly, it is the custom for bhatiyāras and pathāns to conduct the retail trade. The profits of this trade appear from the accounts of the retail sellers themselves to be 100 per cent. One of the bhatiyāras of Dehra for instance buys 8 *nānds* for Re. 1 and sells them for 4 annas each.

Section V.—The position of the village potter is that of the regular menial or *parja*, receiving both customary dues in exchange for the articles which he supplies and presents on various occasions. In some districts he holds a certain amount of land rent-free from the landlord, to whom in return he supplies gratis all the vessels needed for household use and a new set of vessels on the occasion of a marriage. But in most districts he merely has the right of digging his clay free of charge, and if he cultivates land he has to pay rent for it like any other tenant. After he has supplied his landlord with vessels, each potter works for a certain number of customers among the cultivators whom he calls his *jijmāns*. One potter usually supplies fourteen or fifteen houses. The vessels which a potter supplies to his *jijmāns* in return for fixed customary dues are *kunds* or other vessels for drawing water from wells, *kolsis* for sugar-making, *gharros* for the threshing-floor's, *chilams* and earthen lamps or *chirdghas*. All other vessels are usually paid for separately in grain or cash. Where canal irrigation has been introduced, as in Etāwah and Agra, the potter's profession has been greatly reduced in importance, as large numbers of vessels are no longer needed for the wells. Under these circumstances the village potter is sometimes found to have entirely ceased from claiming customary dues from the cultivators. He then sells all his vessels for grain or cash, except to the landlord, who still gets his vessels gratis in return for the clay used by the potter.

The number of vessels annually supplied in return for customary dues by each potter may be roughly estimated as follows:—

Water pots for three wells	...	...	...	...	3,000
Pots for 7 sugar presses	...	...	...	...	70
Pots for 3 threshing-floors	...	...	...	...	30
Chilams or tobacco bowls for 14 families	...	...	...	...	336
Earthen lamps for 14 families	...	...	...	...	300

In return for these vessels he gets from each cultivator at the time of the threshing of the spring and autumn crops a fixed due called *pharwār* or *chamahi*, which is generally 20 seers of grain.

Besides this in many districts when the reaping of the crop begins he is given a big bundle of corn containing about 2 seers of grain. This due is called *lahua* or *pūri*. From the fourteen families whom he supplies he thus receives about 12 maunds 28 seers of grain in the year, worth about Rs. 37. For the vessels sold separately he gets about Rs. 2 in cash or grain every year from each family, which makes his income from this source Rs. 28 a year. On special occasions, such as a marriage, when he takes a new set of vessels to a house, he is given grain or cash worth on an average about Rs. 2 and he receives similar presents from the women

of certain castes when performing wheel-worship before a wedding. On the presentation of the vessel called *jhalúr* also to a father on the birth of a child he is generally paid Re 1.

The presents received by him on such special occasions probably amount to Rs. 7 a year, and his whole income from the villagers for vessels supplied is thus about Rs. 72 a year. But besides supplying his regular customers or *ijmdás*, the potter can sell his spare pots to outsiders, and in the neighbourhood of big towns he can dispose of them at a very good price. From such sales he probably realizes Rs. 10 a year. This brings his earnings from the manufacture of earthen vessels up to Rs. 82 a year. The village potter however, as has been already stated, is unable to work at pottery during three or four months of the rainy season, and at this time of the year, if he has not got any land of his own to cultivate, he either works as a labourer or more often as a carrier, using for this purpose the donkeys or bullocks which at other times of the year serve for the carriage of his clay. In some districts, such as Muttra and Agra, dung cakes are almost entirely carried by kumhars, while in others they are specially employed for the transport of indigo or of grain where rent is paid in kind. His earnings in this employment must be at least 2 annas a day, so that during the four months of the rains, allowing for the feed of his donkey, he should make at least Rs. 12. The total annual earnings of a village potter probably amount therefore to about Rs. 90, and he is consequently better off than the town potter.

Section VI.—The manufacture of earthen vessels being common to every village in every district with the exception of two or three districts in the Kumaun division, there is no such thing as the import and export of common red pottery. Glazed and coloured pottery, either ornamental or useful, is however exported from various districts. The chief centres of the trade in ornamental articles are Chunar (Mirzapur), Nizamabad (Azamgarh), Lucknow, Khurja (Bulandshahr), Bahadurgarh, (Meerut), Rámpur and Amroha (Moradabad). The special wares produced at each of these places have already been described. In no case can either the foreign or internal trade be called considerable.

Chunar exports brown glazed pottery of the annual value of Rs. 3,000 to Calcutta, Lucknow, Delhi and Meerut, and is apparently the most flourishing pottery centre in these provinces. It is said to be the intention of the chief manufacturer to introduce the making of this pottery at Lucknow, where there is already a large depôt for its sale. From Nizamabad brown and black pottery ornamented with silver foil is hawked all over the provinces by travelling merchants, and once a year consignments are sent to Calcutta, Sylhet and Bombay for export to Europe. The total annual exports however are valued at only Rs. 600, and the trade is said to be declining.

Lucknow sends brilliantly coloured *sardás*, plates, cups and saucers to the annual value of at least Rs. 2,000 to all the districts of Oudh, and to Cawnpore, Agra and Bareilly. The celebrated painted and terra cotta Lucknow figures are almost all sent to Tillery and Co. at Delhi, or to a depôt at Cawnpore, whence they are exported to Europe. The annual value of exports is about Rs. 500. The Thákurs, with whom the industry originated, came to Lucknow as stone-carvers in the eighteenth century and were taught their present craft by Claude Martin, the founder of La Martinière. Their trade has been recently injured by the fact that some of their best workmen have been induced to emigrate to Calcutta and to the Deccan. Khurja (Bulandshahr) produces glazed ornamental vases and flowerpots to the annual value of Rs. 1,000. They are sold chiefly at the Nauchandi Fair at Meerut, where a considerable quantity are brought for export to Europe. The glazing art was introduced by Mr. F. S. Growse 11 years ago, and patterns were copied from vessels brought from Meerut and Rámpur.

Bahadurgarh (Meerut) is the original home of the pottery now known as Khurja pottery, and a very large proportion of the articles sold as having been made in

Bulandshahr are believed to be really products of Bahadurgarh. The value of the exports, which is not estimated, must be large, as it is stated that three or four of the workers in glazed pottery pay income tax. The industry was introduced from Multán about 200 years ago and has remained ever since in the hands of a few Muhammadan families.

Rámpur ornamental pottery closely resembles that of Khurja and of Bahadurgarh, and is said, like them, to have been originally introduced from Multán. It seems until lately to have been confined to the manufacture of tiles, slabs, &c., intended to be built into mosques and tombs; but the European demand which has lately arisen has developed a trade in flower-pots and vases. The export at present amounts to only Rs. 500 a year, but there seems to be a prospect of its increase.

Amroha pottery is a thin and brittle ware roughly coloured and its chief merit is the lightness of the clay of which it is made. Until a few years ago the trade was in a very prosperous state, but owing to the introduction in an evil hour of crude European designs it has now almost ceased to attract attention.

Ornamental wares are also produced at Aligarh, Gonda and Sitapur, but in these districts the annual outturn is very small and the exports insignificant in value.

The chief centres of the trade of useful articles are Lucknow, Fyzabad, Benares, Agra, Bareilly and Meerut. The wares exported from these districts are chiefly glazed or coloured *luggas*, *chilams*, *rikabis*, ink-pots and *kándis*, which are taken by districts where only common red pottery is made. The bulk of the purchasers are naturally Musulmáns.

Lucknow has undoubtedly the most flourishing trade in these wares, exporting chiefly to Partágarh, Fyzabad, Bara Banki, Hardoi, Basti, Bahraich, Rae Bareilly, Sultánpur, Gonda, Sitapur and Kheri, goods of the annual value of at least Rs. 3,000. From Lucknow also are exported to the neighbouring districts enormous quantities of rude toys at the time of the Diwáli festival, which are estimated to be worth Rs. 800 a year.

Fyzabad exports its wares to Partágarh, Jaunpur, Basti, Bahraich, Sultánpur and Gonda. The export trade is carried on by tobaccoconists, pathans and bhatiyaras and is said to be worth Rs. 1,000 a year. Benares sends its exports to Jaunpur, Basti and Gházipur in the North-West Provinces and to Dinapur and Patna in Bengal. They are valued at Rs. 1,000 a year.

Agra exports wares valued at Rs. 500 a year to Etah, Etáwah and Muttra in the North-West Provinces and to Dholpur and Delhi in the Panjáb.

Bareilly exports glazed articles of European shapes, such as chamber utensils, jugs and filters, to Moradabad and Sháhjahánpur, where they are used by the troops. This trade should be carefully encouraged and brought to the notice of the Commissariat Department, as the wares seem to be quite as good for all practical purposes as those imported from Europe, and far cheaper.

Meerut exports to Muzaffarnagar, Saháranpur, Bijnor, Garhwál and Dehra Dún wares valued at Rs. 500 a year.

Section VII.—It appears therefore that a steady demand exists only for objects of common utility, and that the trade in the finer products of the potter's art when of pure oriental design meets with little encouragement. Rude earthenware articles will always be used by cultivators for irrigation and for the storage of their grain, by shopkeepers for holding their wares, and by all the poorest and lowest classes for the preparation of their food; the use of kerosine tins for the carriage of water has indeed become common, but it can never be so universal as to seriously affect the demand for earthen vessels; similarly the use of china vessels for

Future of the pottery trade.

eating and drinking, though largely adopted by the wealthier Musalmáns, is not considerable enough to reduce the outturn of the native vessels used for the same purpose, nor has any substitute yet appeared for the glazed *chilams* and *huggas*, of which the consumption is very large. With regard to the china jugs, basins, cups, saucers and plates imported for the use of Europeans, there seems to be no prospect of the introduction of the manufacture into these provinces, as no true china clay exists; there is however no reason why the production of roughly glazed wares, such as filters, pipkins and chamber utensils, which are already made at Bareilly and at the Allahabad jail, should not be widely extended, and in view of the large consumption of these articles by British soldiers the encouragement of this industry is advisable.

CHAPTER VIII.

CEREMONIES AND SUPERSTITIONS CONNECTED WITH EARTHEN VESSELS AND THE POTTERS' IMPLEMENTS.

Section I.—In Hindu domestic religion of the present day earthen pots play two very important parts. The first is that of an idol or representation of the god addressed, and the second is that of an offering. Whatever form of pot may be chosen for these two purposes, it is always known as *ghant*, *ghat* or *kalas*. The term *ghat* is generally used for the idol and the term *kalas* for the offering, but the practice differs in different places. Any Hindu deity may be worshipped under the form of an earthen jar. The ceremony of transforming the pot into the deity is called *ghatasthápana*. It consists in placing an earthen jar full of water before the worshipper on a little heap of grain, setting on the top a saucer full of grain for a lid, and on top of this again an earthen lamp of clarified butter. Sometimes instead of the saucer of grain the leaves of the five sacred trees called the *páñch pallo* are placed on the jar. The five trees are mango, *jawan*, *gular*, *pipal* and *pakri*. The distinctive marks of the worshipper are then painted on the jar in red ochre or cowdung, the wick is lighted, and the invitation to the deity to make the jar his temporary dwelling place is pronounced. This invitation is called the *abóhana* and consists in the following formula :—“ Oh god, come here, come here, stay here, stay here. Take up thine abode here and receive my worship.” The gods most commonly worshipped in this manner are Ganesh and Baruna, who are both thought to be gods of good luck. It is from this fact probably that a jar full of water is considered a lucky omen. Ghentu, the obscene god of the itch, is in the same way worshipped by women at the Holi festival in the form of a broken jar on a dunghill outside the village.

The offering of earthen articles is chiefly confined to the worship of the lower gods or godlings, and such articles, whatever their forms, are generally known as *kals*. In his Folklore of Northern India Mr. Crooke restricts the application of this word to the beehive-shaped vessels offered at village shrines by the gonds, but it seems in reality to have the wider meaning of any earthenware religious offering. The earthen spike presented by a Muhammadan to adorn the top of a mosque or a fakir's tomb is called a *kalas*, as well as the *gharra* in which milk is offered to the gods.

Section II.—With this preface a brief sketch of the various superstitions and observances in connection with earthenware articles which affect the life of a Hindu may be found interesting.

The *utheiya* is the first of these ceremonies, and meets the Hindu child on the threshold of its life. As soon as it is born it is washed with water from a water jar

(a *gharra* or *kalsi*) and in the evening this jar first of all, and then all other vessels touched by its mother during confinement, are thrown away on the village rubbish heap and a set of new vessels taken in their place.

Section III.—The *jhālār* is in the northern districts presented by the village potter to the father on the day after the birth of the child. It is either a large cup with figures of birds painted round its circumference, or a rude imitation of a bird. It is hung up by the father in his house and worship to Devi is performed before it.

Section IV.—The *mūlshanti* ceremony is the next in order which may have to be performed, in case the child has been so unlucky as to be born at the hour of the month called *abhigat mūl*. So much is the evil influence of this period dreaded that the father of a child of the *mūl* (an astronomical tree in heaven) sometimes gives away the child to be adopted by a relative, and in any case he must not look on its face for eight years. The mother responsible for such a misfortune goes through the *mūlshanti*, a kind of churching, twenty-seven days after the birth of the child. For this purpose she orders of the village potters an unbaked *karna* with twenty-seven spouts, and a *gharra* which is transformed into a *kalas* by the usual ceremonies. Then on one of the walls of her house she draws a square with red ochre and fills it with rude drawings of Kali, Ganesh, and other gods. Before this square she offers up the *karna* of twenty-seven spouts, the leaves of the five sacred trees, earth from eight places, one hundred different kinds of medicine, seven kinds of grain, five kinds of metal, and, if well off, a *prithima* or medallion of gold with a figure of the *mūl* tree on it. She then bathes the child with water from the *karna* and worships Baruna in the *kalas*.

Section V.—*Dhanatiya ka puja* is a ceremony probably peculiar to the Oudh districts. It must be performed by the mother about eight years after the birth of her first born son. It consists in a pilgrimage to her father's village together with her son, and the offering of two peculiar steeple shaped *kalas*, pierced each by seven holes, at the shrine of each of the *suttis*, or women who in former times burnt themselves on the pyres of their husbands.

Section VI.—The ceremonial use and worship of various earthen pots runs through the whole of the marriage rites among all the higher castes whose marriage is managed by brāhmans.

The first ceremony is that of the betrothal, *tika*, which takes place in the boy's house in the presence of all the friends of the latter and of the family brāhman and nearest male relative of the girl. A new *gharra* is made into a *kalas* or *ghat*, and Ganesh, Lakshmi, Brahma, Vishnu, and Shiva are all adored in turn.

The worship of ancestor-representing vessels or the *pitrohula bartan ka puja* is the next marriage ceremony; it is performed on the day of oil, *tel ka din*, or the day on which the women of the neighbourhood smear the little bridegroom with rapeseed oil, wheat flour and water. A elod-crushing beam, *sarawān*, is erected in the yard, a *kalas* set up by it, and Ganesh invoked by the boy. His nearest female relative, known on this occasion by the ceremonial name of *deohai*, then brings forth five earthen pots, namely a *mitki*, a *hāndi*, two *dohāni* and a *karna*. From an earthen saucer, called in this connection *aipan*, she takes a paste of ground rice and turmeric, smears her hands with it, and worships the nine manifestations of Devi by imprinting her five finger marks on the pole and on each of the five vessels over an unlighted hearth built near the pole. She then goes through the pretence of cooking food with all these vessels.

Into the *hāndi* she drops the pulse called *urd*, into the first *dohāni* fine rice, into the *charai* an oil seed called *barra*. She then turns the second *dohāni* upside down and goes through the action of cooking bread on its bottom. After this the *deohāi* drops into the *karuā* a grain of rice for every god in heaven and for every remembered forefather of the boy, calling upon each by name. The vessels are next solemnly set before the *adhāpita*, the rude symbol on the walls of the courtyard before which family worship is performed. There they are left until the boy comes back from his marriage journey, when they are cast into a river or pond.

The next day, the day of the departure of the bridegroom, begins with yet another rite connected with earthen vessels. After the robing of the bridegroom a jar or saucer is put on the ground and the boy is bidden to kick it till it break. If he break it with one kick this is hailed as a good omen of a harmonious wedded life. If more than one kick is needed, it is prophesied that the couple will find themselves ill-matched. The frailest vessels are naturally provided.

Meanwhile at the bride's home some of the same rites have been carried on. The worship of the ancestral vessels has taken place here also beneath four poles instead of one, and the family has followed in imagination every ceremony which the bridegroom has gone through. At last the barber of the bridegroom's family arrives to say that the marriage procession is near, bearing in his hand the *aiṇ* or earthen saucer on which, round a rupee, are ranged seven cakes called *sohāgil*. These are distributed to seven married women of the family, and the rite is called the *sohāgil bhōjan*. Next day to welcome the bridegroom a *kahārīn* is stationed at each side of the door with a full jar of water on her head, covered with the saucer of grain and the earthen lamp, as usual. A full jar is an omen of success or victory. Many ceremonies take place after the arrival of the bridegroom, who finally retires to a separate house near at hand.

If the girl belongs to certain important castes, she now prepares for the mysterious worship of the potter's wheel. Two theories are given to explain this worship. The first and commonest is that the wheel as a symbol of reproduction is the emblem of Brahma Prajapati, the creator. In this connection it is a curious fact that Prajapati is the nickname bestowed on the potter in many of the northern villages. The second theory is that the bride is a *gor* or person of low condition before marriage, and she is taken to low places, such as potters' houses to lose part of her low condition by contrast. This explanation is very far fetched.

The usual ceremony is as follows :—

The girl with her womenfolk goes to the house of the family potter, sprinkles the wheel with water from the Ganges, places thereon marigolds, turmeric, ground rice, *dūb* branches, sweetmeats and money and worships the wheel. The potter then clears the wheel, pockets the offerings, and fashions on the wheel four clay lamps, which the girl takes unbaked to her home, sets on the ground before the hand-marks painted on the wall in honour of Devi, and does worship to that goddess. This worship is practically a prayer for the fruitfulness of the marriage. It is specially practised by *agarwāls* and *marwari bamas*. But in Bareilly and the surrounding districts *brāhmāns*, *kayasths* and *jāts*, and in other districts *kahārs*, *mālis* and *saraogis* also observe it. The ceremonies have been imitated in many districts by the lower castes of *Musal māns*, such as *mewatis*, *bhatiyāras*, *kunjaras*, *gaddis* and *sukhtas*.

In Benares and Shāhjahānpur instead of the four clay lamps, seven little jars of unbaked clay are made on the wheel at the time of worship, and are trampled underfoot by the bride and bridegroom when they enter their house together for the first time.

In Farukhabad and Mirzapur among some sets of bráhmans the wheel worship is not performed by the bride herself, but by two elderly women chosen from both families. These have an unbaked vessel turned on the wheel, and a mud idol of Ganesh made by the potter and placed within the vessel. When the vessel is in full circulation they throw flowers over it, stop the wheel, take off the jar, and cover it with a cloth. They carry it home and it is used throughout the marriage for purposes of worship.

Among the kahárs of benares and the kundu *banias* of Basti the wheel is worshipped by the female relatives of both the bride and bridegroom. After the worship the potter makes for the bride's relatives an effigy of the bride and for the bridegroom's relatives an effigy of the bridegroom called, *bálbhadar*, or *birbhadar*. These effigies are worshipped all through the marriage ceremony with a cup full of wine and silver on one side and an earthen lamp on the other. When the marriage processions meet the effigies are exchanged between the two families, and on the fourth day of the ceremony are taken and thrown into a tank. The cups containing the liquor and silver are buried in a certain spot, and after the marriage the bride's brother unearths the cup with his teeth and pockets the cash. In Hamirpur an idol made of cowdung and five pieces of earth called *Gor* are worshipped by the bride on the wheel with offerings of red lead, with which she afterwards stains the parting of her hair.

On the day after the wheel worship the actual marriage rite takes place. The bride and bridegroom sit before a *ghat* or *kalas* beneath the awning, which is sometimes crowned at each corner by a tower of variously sized painted pots called *barj*, and go through many wearisome ceremonies. In Etáwah and Bulandshahr several piles of earthen pots are stuck up on the tops of houses after a marriage. The whole pile is called a *kalas*, and it generally consists of a *gharra*, a *gharriya*, and a regular beehive shaped *kalas* on top of all.

Section VII.—The next inevitable ceremony in which earthen vessels play a part comes after death. On the evening of a Hindu's

Funeral rites. death his heir hangs up two small squat jars (*hundi*) on a round mat of *khas* grass suspended from a *pipal* tree near the dead man's house. Being connected with a religious ceremony, these jars are, as usual, called *ghat*. One of them has four holes in its sides and the other has a hole at the bottom stopped up with cotton wool. In the first is placed an earthen lamp. Accompanied by a bráhman reading verses the heir lights the lamp at evening, fills the second *ghat* with water, and puts a lid on each of the vessels. The lamp flickers all night, while the water from the second *ghat* drips slowly on to the roots of the *pipal* tree. This ceremony takes place every evening until the accomplishment of the ten or thirteen days of mourning, when the two *ghat's* are taken down and thrown into a river or pool.

In cases where the body is buried instead of being borne to the Ganges or some other river, a *karna*, or spouted jar, and a *gharra* may always be seen at the foot of a new made grave. The *karna* has been used by the *kirya dóg* or nearest male relative to bathe his face and hair in after the burning of the body. The *gharra* has been solemnly filled with water at the moment when the grave was complete by the family barber, who has then turned it over, and last of all knocked a hole in its side before he left the grave.

At the end of the period of mourning, *sutak*, the relatives of the dead man, throw away all their old earthen vessels, and take new ones from the potter.

on VIII.—The beehive-shaped vessels offered to the inferior gods are peculiar to Oudh and the eastern districts of these

The offering of the *kalas* or *ghat*. provinces. In Lucknow they are only offered at the shrines of the earth gods of the village boundary *danre ka bhuian*, or at those of some eponymous hero or *bír*. To the village

god the *kalas* are offered when the worshiper has had a stroke of good luck, or when some special prayer has been heard. To the *bir* they are offered when the crops are eaten by mice, when the cows fail to give milk, or when the village is devastated by cholera. The offering must always consist of five *kalas*, usually four small ones and one big one. They are each pierced with seven triangular holes and have a wry tip of earthenware called *burji* stuck on the top. They are sometimes made very large, being as much as four feet high and covered with figures and with fantastic projections holding earthen lamps. They are offered without the help of a bráhmaṇ, and the only rite observed is the printing of the five finger marks in turmeric and rice on the vessels.

Rude earthenware figures of horses or elephants are also offered in great numbers at the shrines of the *birs*. At some of these, round which fairs regularly take place, thousands of figures are annually deposited, and large mounds are raised by the fragments. A water vessel with a hole in the bottom is invariably balanced over the phallic emblem in the shrine of Shiva or Mahadeo in the hot months, in order that the constant dripping may keep it cool. In Etáwáh unused *gharros* are often offered to Devi by way of propitiation. A bráhmaṇ offers them for the worshipper and ties a thread round the neck of the *gharra*. In some parts of the same district the villagers always offer their broken vessels that have held milk or clarified butter to Anpurána Devi, saying that the savour is pleasing to her.

At Etáwáh, again, in the rite called *gatka*, performed when any person is very ill, a *gharra* full of water is taken in dead silence to a place where four roads meet, and used apparently as a charm to scare away demons, together with grain, charcoal, turmeric and an iron nail.

In all these ceremonies the vessels concerned are called *kalas* or *ghat*.

Section IX.—Besides being worshipped at marriages the potter's wheel is worshipped by *agrawala banias* at the investiture with the sacred thread. Potters themselves worship it as a fetish on two occasions, once on the *Shrāvatrī ka dīn*, when all other Hindus fast and offer water to

Other common superstitions respecting pots and the potter's wheel.

Shiva, and once in the Dasehra, when they make an oblation of a pumpkin upon it.

In Garhwál the scrapings of earth from the potter's wheel are held to be very powerful for incantations. In Sháhjahánpur the village boys have a strange superstition about the potter's pestle, which they call *birhaspat*, from the planet Birhaspat or Jupiter that presides over marriages. When a boy wishes to marry he steals the pestle and hides it in some dark place, thinking it will hurry out of such an unpleasant situation and bring about his marriage more quickly.

Besides the large variety of *kalas* there are various special earthen vessels used in special rites. In Bareilly the *chaumukh*, a large lamp with four mouths, is used for offering of light to the gods on occasions of rejoicing. In the same district an incantation for scaring away an epidemic or the evil spirit possessing a person is conducted by means of an *utāre ki karáht*, an earthen pan with from five to twenty-one lamps projecting from it. Water and flowers are placed in it, the lights are burned and passed round the place or person affected, and the vessel is taken to the meeting of four cross-roads and placed on the ground. In Etáwáh a boat-shaped saucer with a knob on one end and marked usually with eyes, nose and mouth is used for presenting *huichri* to bráhmaṇs in the month of *Magh*. It is called *nawoin*. It is used again in the *Danait-puja* or ink-worship performed at the Holi festival, and is then kept till the Diwali festival, when it is set floating on a tank or stream with a wick burning inside.

All over India various omens are taken from earthen vessels. To see a *gharra* full of water is very lucky, and to meet an empty *gharra* while going on business is

a sign of misfortune. The bursting of a *gharra* full of anything of its own accord and the meeting of a teli with a *gharra* full of oil, which must be a very common occurrence, are extremely unlucky. If a *hándi* bursts when something is being cooked in it, the owner of the house is to suffer great loss of money and sickness. By all Hindus an earthen vessel fresh from the kiln is held perfectly clean and it cannot be defiled by the touch of men of the lowest castes. But as soon as it is wetted by water it is no longer proof against the touch of all persons. For this reason strict Hindus lay in a stock of earthen vessels before the beginning of the rains, for vessels bought during the rains are not above the suspicion of contact with water. When a new water-pot is used many Hindus of the higher castes trace on it the propitious marks of the *sri* *tika* with clarified butter.

Musalmáns, on the contrary, hold vessels made by Hindu potters unclean until they have murmured over them an invocation to the Prophet. Thus ladies of the Sunni profession say before using a new pot *Tal ki mitti, kumhár ka chát, ubí ke kalme se hód hotá pík*. "The clay of the tank and the potter's wheel by the verse of the Prophet have been made pure." The Shiah ladies merely say a verse from the Koran.

In all the districts lying at the foot of the Himalayas, Hindus will not use earthen vessels unless they are covered with fantastic black and white lines, which are probably designed to scare away demons from taking up their abode in the pots. The higher castes of Hindus may eat and drink out of earthen vessels only once, and after that must throw them away. An exception is sometimes made in the case of *gharras*, which are used more than once. From this rule it naturally follows that whenever possible a Hindu will keep brass vessels, as the use of earthen vessels is far more expensive in the long run. Some orthodox Hindus apply this rule to articles of glass and porcelain of European manufacture, while others use them repeatedly.

Musulmán's often prefer earthen cooking vessels to those of brass, and the longer they can keep these in use the better are they pleased. To make them less liable to crack they often cover the lower halves of their cooking pots with a paste of mud and chopped straw called *lewa* or *lesar*.

The only earthen vessel used by Musulmán's in their religious rites is the *bádhana*, a jar with a spout to it, from which they pour out water for their ablutions. One of these is always kept for common use at every mosque.

CHAPTER IX.

THE GLASS TRADE, ITS HISTORY AND DIVISIONS.

Section I.—The manufacture of glass was known in ancient India as early as

Indian glass in the past.

800 B. C., for in the Yajur Veda, generally supposed to have been written about that time, glass is mentioned as one of the articles of which female ornaments were made. It is also noticed in the Mahábhárata, and in an old book called the Yuktikalpataru the effects on the human system of drinking water out of a glass tumbler are stated to be the same as those of drinking out of a crystal cup. In more recent times during the sixteenth century the glass of India is said to have been exported in large quantities to Europe, and in the north of Italy there is a tradition that the Venetians at one time obtained, if not their raw glass, at least its ingredients, from the plains of Hindustán. It is difficult to believe this story, for there must have always been abundant material in Europe, and the Indian glass, if it resembled that now made, cannot have been of a fine quality.

Section II.—Ever since the year 1877 the Government of India has at various times considered the possibility of the manufacture in India of the large quantities of glass articles now imported from Europe. Experiments have been specially tried in the matter of beer bottles and of ornamental glass beads.

History of recent experiments in glass : manufacture and suggestions for their continuance.

The first experiment was conducted in the Panjāb by Mr. H. Whymper, Manager of the Murree Brewery Company, at Jhelum. After submitting specimens of native glass to experts in Europe and obtaining favourable opinions, he brought out a German glass maker and began a series of experiments. He succeeded in turning out bottles resembling those made in Europe, but, owing apparently to the incompetence of his manager, finally abandoned the undertaking.

In 1879 Mr. H. Smith, an indigo planter owning land in Aligarh in the centre of the native glass manufactories of that district, volunteered to try experiments in the manufacture of bottles, and a small sum was advanced to him for this purpose by the Government. Moulds for the bottles were supplied by the Agricultural Department; but no accurate information was possessed by Mr. Smith as to the methods of bottle-blowing, and the glass workers employed had never worked with moulds before. Bottles were indeed obtained, but it was found impossible to get them made of uniform weight and thickness, and, the workmen falling ill, the experiment was discontinued after having been persisted in for about two months. It is to be regretted that operatives from the Bijnor district were not set to this work; as they are the only ones in these provinces who can make bottles in moulds after the European fashion, and they might have succeeded better.

The next experiment which was tried was with regard to the manufacture of glass beads, the importation of which into India is very large. Mr. Wilson, then Assistant Engineer, was put on special duty for some time in 1882 in this connection. He visited the glass factories at Venice, made notes of the methods there employed, and brought out to India a complete set of the tools used at Venice for the manufacture. He conducted experiments with these tools at Bhagalpur, but for some reason found it impossible to develop sufficient heat in his furnace. The glass produced was consequently full of air bubbles and could not be cut homogeneously, and the experiment had to be given up.

It will be seen from this account that no serious and steady attempt has ever been made to produce in India glass articles resembling those of Europe. The experiments made have in each case been continued only for a short time, and have failed from accidental causes and not from the impossibility of success. Continuity of experiment is what is needed, and this might be secured at a trifling expense by starting the industry in one of the district jails, such as that of Etāwah or of Aligarh, where *reā*, the impure carbonate of soda, which is the main ingredient of native glass, and indigo stalks, the most effective fuel, are extremely plentiful and cheap. The difficulties to be encountered consist first in lack of technical knowledge and secondly in the composition of the native glass.

The first difficulty might be easily overcome by sending two young men from among the Mahammadan bottle blowers of Bijnor to a bottle factory of the commonest class in England or to one of the small glass factories with primitive appliances which are worked in the midst of the forests of Wurtemberg. After being left in Europe for two years to learn the trade and then sent back to India with a complete set of tools and practical experience of their use, they could act as instructors in a jail or technical school, and would do more towards setting up a flourishing trade in India than a dozen visits of highly educated Englishmen to the workshops of Venice.

The faulty composition of the native glass can only be remedied by local experiments which should be directed to toughening the glass and getting rid of its muddiness of colour. The lack of toughness in native glass is apparently due to deficiency of lime, and this could probably be easily set right. On analysis, it appears that common English green bottle glass contains 29·22 per cent. of lime, while native glass contains only 1·22 per cent. All other constituents are present in nearly equal proportions in both kinds of glass. For the purpose of clearing the colour of native glass the use of oxide of arsenic has been suggested and might possibly prove successful.

Section III.—The manufacture of glass in these provinces is divided into four branches, namely the manufacture of crude native glass or *kānch*, the manufacture and colouring of glass bangles or *chūris* from the crude native glass, the manufacture of flasks, ink-pots, &c., blown or moulded from the same, the manufacture of beads, and the manufacture of lamp chimneys, globes, vases and retorts from English glass. The retail trade is carried on not by the artisans themselves but by separate traders. Occasionally one set of men will combine the manufacture of crude glass with the manufacture of glass bangles, but this combination is rarely met with.

CHAPTER X.

THE MANUFACTURE OF CRUDE NATIVE GLASS.

Section I.—Crude native glass is made in nine districts only, *viz.*, Aligarh, Agra, Bulandshahr, Etah, Etāwah, Fyzabad, Mainpuri, Meerut, and Rae Bareli. The location of this manufacture seems to be determined chiefly by the situation of canals, which cause a plentiful efflorescence of carbonate of soda from the soil irrigated by them, and by the supply of fuel. Thus Aligarh, Agra, Bulandshahr, Etah, Etāwah, Mainpuri, and Meerut are all distinguished by the network of canals by which they are overspread, and by the extensive cultivation of indigo and *arkar*, the dry stalks of which form the best and cheapest kind of fuel; while in Fyzabad tamarisk grows in enormous quantities on the banks of the Ghagra, and in Rae Bareli there are large tracts of *dhūk* jungles.

The most considerable manufactories are those of Aligarh, Mainpuri and Etāwah, whence immense quantities of blocks of crude glass are distributed all over India by the East Indian Railway.

Section II.—The chief ingredient in the glass of these provinces is in every case the saline efflorescence called *reh*, and not powdered flint rock or Fuller's earth as it is in the Panjāb. *Reh* is prepared in canal districts in the following manner. A plot of barren unculturable land in the neighbourhood of a canal is rented by the manufacturer at the beginning of the hot weather. The rent of an area capable of producing 2,000 maunds of *reh* in one season is about Rs. 50. This plot is divided up into little square beds or shallow tanks by ledges of mud about three inches high, and an inch or so of canal water is run over them and left to stand. In Mainpuri the surface of each bed is covered by a heavy board after the water has thus been turned on. After five or six days the saline deposit beneath the soil rises up and dries into little flakes called *papri*. These are scraped off and stored under a thatch until they are wanted for the baking process. The amount usually collected by each manufacturer during the season, which extends over April and May, is estimated to be three or four thousand maunds.

In Fyzabad and Rae Bareli districts, where there is no canal irrigation, earth impregnated with *reh* is scraped off the surface of the land, heaped together, and

surrounded with a ridge of earth about a foot high. Well-water is then mixed with it, the whole heap being known as *reh ka bāda*. After standing for five or six days the pure *reh* comes to the top by evaporation, and is scraped off and made into balls weighing about one-seer each. Before being put into the kiln these balls are broken up and sifted through a sieve.

At the end of May when enough *reh* has been collected, it is thrown into the kiln, which will be afterwards described, in lots of about 400 maunds at a time and heated for twenty-four hours until all moisture has evaporated. It is then taken out and mixed with the various other ingredients necessary.

The crude glass produced is always primarily either greenish white or black. The only exception is to be found in the Agra district, where at Firozabad a pure white glass resembling coarse English white glass is produced.

(a) Black glass is of two qualities. The first quality is produced by the addition of one to four per cent. of black iron oxide and a very small quantity of saltpetre to the scorched *reh*. The 2nd quality is produced by the addition of 20 per cent. of sheep or goat's dung to the scorched *reh*.

(b) Greenish white glass is produced at Etāwah and Mainpuri by adding to the scorched *reh* about four per cent. of saltpetre at Rs 7 a maund, and one-third to two per cent. of *senda*, a red ferreous stone at Rs. 3 a maund. In other districts this red stone is omitted.

When the ingredients have been properly mixed with it, the *reh* is once more thrown into the kiln and melted up continuously for about 18 days and nights, being from time to time stirred with an iron shovel and a long iron hook. It is then run out into a pit, allowed to cool for 10 days and broken up into big blocks, which are ready for exportation. Four hundred maunds of *reh* and other substances are usually melted up at one time, producing about 300 maunds of glass.

Black glass is considered inferior to greenish white glass and its price is lower. The average price of black glass is Re. 1 for 1 maund 10 seers in the districts where it is made, and Re. 1-4 a maund in the districts to which it is imported. Greenish-white glass sells in Etāwah, Mainpuri and Aligarh at Re. 1 for 1 maund 10 seers, in Meerut at Re. 1 a maund, in Etah at Re. 1 for 35 seers, and in Bulandshahr at Rs. 2-4 a maund. In districts to which it is exported the usual rate is about Re. 1-8 a maund.

Section III.—The basis of all coloured glass is the whitish green glass, the composition of which has been described in the last section. To it various colouring materials are added, sometimes, as in Etāwah and Mainpuri, by the original manufacturer of the crude glass himself in the same kiln as that in which the *reh* is melted up, but more often by the purchaser of the crude glass, who proposes to make it into bangles or other articles. It is convenient, however, to treat this process under the head of crude glass. The weight and detail of the materials which are added to one seer of the original greenish-white glass to produce the various colours are shown in the following table:—

Colour.	Materials.	Weight.
1 Transparent dark green.	Dioxide of copper.	1 tola.
2 Opaque light-green	Dioxide of copper Lead Tin Yellow shale	2 tolas. 1 chittak, 1 Do. 1 Do.

Colour.			Materials.			Weight.
3	Light-blue	...	Sulphate of copper	...	...	1 chittak.
4	Sky-blue	...	White Firorahd glass	...	...	1 seer.
			Chep, a white stone	...	...	2 chittaks.
			Patra, a stone	...	...	½ tola.
5	Indigo-violet	...	Chep	...	...	2 chittaks.
6	Opaque lemon-yellow	...	Pñi, a powder of lead, tin and yellow shale.	...	...	3 chittaks.
7	Opaque brown	...	Black glass	...	...	4 chittaks.
			Oxide of copper	...	...	1 Do.
8	Opaque ochre	...	Tin	...	...	1 chittak.
			Lead	...	...	1 Do.
			Goramba, a red stone	...	...	1½ Do.
9	Dark-red	...	Lead	...	...	1 chittak.
			Zinc	...	...	1 Do.
10	Light-red.	...	Copper oxide	...	...	1 tola.
			Black glass	...	...	4 chittaks.
			Or black glass	...	...	1 seer.

Section IV.—The kiln (*bhatti*) used for the scorching of the *rek* and for its manufacture into crude glass is of quite a different

The kiln for the manufacture of crude glass.

kind from that used by bangle-makers or by glass-blowers. Its shape varies slightly in various districts. In Aligarh and Bulandshahr it resembles a cone with a semi-circular section taken out of it. It is built of sun-dried bricks and rises from three feet below the surface of the ground to seven feet above it, being from 12 to 15 feet in diameter. It consists of two stages, of which the lower, the furnace, called *tāq*, reaches to the level of the ground, while the upper one, in which the *rek* is held, fills up all the space above the ground. The two stages are separated by a flooring of clay, on which the *rek* rests. In front of the furnace is a pit in which the fuel is kept, and into which the two doors of the furnace open. One of these doors, used as a stoke hole, is called *int* or *jhokant*, the other for raking out the ashes is *patkar*. Between the

two is an ash-pit, *tiaia*. The *reh* is introduced into the upper stage through a hole called *majli bari* or "middle window" which is on a level with the ground and on the opposite side to the stokehole. On either hand of this hole are two smaller ones through which the *reh* is watched and stirred. These three holes are covered with earthen covers while the fusing is in progress. Besides these there are four air holes on the crown of the kiln, one in the centre of the top and the other three ranged in a semicircle exactly above the "middle window."

In Mainpuri, Etáwáh, Rae Bareli and Fyzabad the kiln for the fusing of the *reh* contains one compartment only, consisting of a dome of clay 20 feet in diameter and 8 feet high. The fire burns in the centre of the floor of the dome. Round the sides of the dome are pits or large earthenware receptacles on a level with the fire connected together by runnels of clay. In some of these pits the *reh* is fused and it is then made to flow into the others for the purpose of cooling. A description of this kind of kiln is nowhere clearly given, but that here attempted appears to be correct. The fuel used consists of indigo or *arhar* stalks in every district except Fyzabad and Rae Bareli, where tamarisk and *dhak* or *babul* wood are used. For the making of 200 maunds of glass 5,000 mds. of indigo stalks are required. Five or six men and boys have to attend continually to the kiln. Two are employed for a wage of 4 annas a day and 1 chittak of ghi to watch the fusing, and four labourers act as stokers for Rs. 6 a month. Five fusings usually take place every year.

Section V.—The manufacturer of crude glass is always an independent man employing hired labour. He is usually a Musulmán, but of no particular caste. The reports received from Etáwáh, Mainpuri, Aligarh and Bulandshahr give detailed estimates of his profits.

The first three show a remarkable agreement, giving the profits on 400 maunds of crude glass, the produce of one fusing, as about Rs. 50 and the total annual profits of the manufacturer on five fusings as about Rs. 250. The Bulandshahr report however states that the profit on the manufacture of 550 maunds of glass is Rs. 107, which would bring the annual profits up to about Rs. 2,500. This estimate is probably exaggerated, and the exaggeration seems to be due to the fact that the selling price of Bulandshahr glass is mistakenly stated to be Rs. 2-4 a maund, whereas in all other districts it is about Re. 1-2 a maund.

The following table shows the profits on the manufacture of 400 maunds of crude green glass in the Mainpuri district:—

	Rs.
Rent of <i>reh</i> -producing land and canal rates	30
10 maunds saltpetre	30
Red stone	4
Labour and carriage of materials	65
Fuel	100
Building or repairing of kiln	25
Rent of land on which kiln stands	10
Miscellaneous	6
Total cost price of 400 maunds of glass	270
Selling price of 400 maunds of glass	320
Profits on one fusing	50
Profits on five annual fusings	250

Section VI.—No accurate statistics as to the internal trade in crude glass are available, but it may be roughly said that the Meerut and Rohilkhand divisions are supplied by Aligarh, Oudh by Mainpuri and Bundelkhand, and the districts bounding it on the north by Etáwáh.

Each of these three districts is said to produce annually about 60,000 maunds of glass, and the production is being greatly stimulated by the simultaneous large increase of the area planted with indigo and of the area covered with *reñ* by the action of canal water.

The other districts mentioned as manufacturing crude glass barely make enough for their own requirements.

CHAPTER XI.

MANUFACTURE OF GLASS BANGLES OR CHURIS.

Section I.—Glass bangles are reported to be made in the following nineteen districts: Agra, Aligarh, Banda, Bareilly, Bijoor,

Location of factories.

Budaun, Bulandshahr, Dehra Dún, Etah, Etáwah, Fyzabad, Gházipur, Hamirpur, Mainpuri, Meerut,

Rae Bareli, Saháranpur, Sháhjahánpur and Sultánpur. It is probable that there are many other districts in which this industry is carried on unknown to the compilers of the district reports, for in four of those abovementioned it was at first stated that no glassware was produced, and its existence was only discovered from references made in other reports which on enquiry proved to be correct. The chief centres of the trade are Hosain and Sikandar (Aligarh), Shikohabad and Karhal (Mainpuri), Phaphúnd (Etáwah), Jalesar (Etah) and Firozabad (Agra). From these places bangles are exported as far as the north of the Panjáb on the west and Calcutta on the east to the annual value of Rs. 1,00,000.

Section II.—The furnace for the manufacture of glass bangles is always roofed

The furnace.

over and is a roughly pentagonal dome of clay varying in size with the number of workers and covering a pit about three feet in depth in which the fire burns.

The fire is fed through a large stokehole called variously *jotak* and *jhokant*. All round the sides of the dome about three inches above the level of the ground are small horse-shoe shaped opening's called *bári* or *bára* through which the workers hold the glass in the heat of the furnace. During the process of manipulation each of these openings is flanked by two clay walls or wings, so that every worker has a separate stall or compartment for himself. The wings are called *pattá*, and the whole compartment *dákán*. Inside the furnace on a level with the sill of each opening runs a clay ledge all round three inches broad, and on this is rested in front of each opening either an earthen crucible, *ghariya* or a curved potsherd *tikra*, in which the crude glass or the colouring matter is melted up. Before the spot where the workman sits and resting on the ground in the centre of the space between the extremity of each wing of the stall is a big flat stone called *pathri*, *thumba* or *gathar*. One edge of this stone hangs over a square pit called *pait* for receiving completed bangles; and beyond the pit is a broad step or ledge, *kandi*, in front of the operating hole. If the workmen, as is often the case, belong to one joint family and share their profits in common, there is one compartment set aside for each workman, and two common compartments. At the end of one of these common compartments is the crucible holding crude black or green glass being melted up with colouring materials, and at the end of the other is the crucible in which thoroughly molten glass is kept ready for immediate use. It is necessary to have two crucibles for this purpose, as, if there were only one crucible, it would be full of half molten lumps which would interfere with the work.

If, however, the workmen are independent of one another, each man keeps inside his special opening two crucibles, one for half melted and one for completely molten glass, and between these is the ledge on which he manipulates his instruments.

In Sháhjahánpur the crucible, into which the crude glass is first put, is let into the roof of the kiln instead of being on a level with the other openings.

The fuel used is wood in some mountain districts, and indigo, *arkar*, or tamarisk stalks in most others. Over the furnace is a framework of wood called *machán*, on which the fuel is placed to dry before being thrown into the furnace. The ordinary furnace burns about two maunds of wood or five maunds of indigo stalks in a day, and melts one maund of crude glass.

Section III.—The tools used in the manufacture of bangles are :—

Tools used. (Plate X.) (1) *Ankri*, *adhkár*, *unkri* or *upri*. This is an iron rod about two feet long, hooked at one end and fixed into a wooden handle at the other. It is used for stirring the molten glass and fishing it out of the crucible.

(2) *Aardg*, *sallákh* or *suja*. This is a long pointed spit of iron of uniform thickness.

(3) *Mála*, *bála*, *thápi* or *pathia*. This is a moulding and pressing tool of iron, shaped in some districts like a big spoon, the hollow of which has been filled up with metal, and in others like a heavy blunt dagger.

(4) *Tekkí*. This is used only in Budaun and Sháhjahánpur. It is an iron rod with a thick butt tapering off to a point.

(5) *Barhána*, *barauna*, *bidarka* or *undr*. This is a short piece of stout iron wire fixed into a light bamboo handle, and sometimes hooked, sometimes straight, at the other end. It is inserted between the inchoate bangle and the various other instruments to prevent its sticking to them.

(6) *Chitárna*. This is an iron rod used in Saháranpur and Etah for twisting the molten glass for certain kinds of bangles.

(7) *Kalchul* or *karchuli*. This is an iron ladle used for transferring the molten glass from one crucible to another.

(8) *Kálbut*, *sundar*, *surtari*. This is a clay cone fixed on to an iron handle.

Section IV.—To make plain bangles the furnace is lighted and some big blocks

of crude glass are set on the floor of the furnace almost in contact with the fuel. After they have been heated for about ten minutes they are thrown into a basin of water, which causes them to split up into small pieces. These are then thrown into the crucible for half molten glass with such colouring matter as may be required, and when properly fused, ladled out into the second crucible for completely molten glass. The workman next dips the end of the iron hook (*ankuri*) into the crucible and takes out a small ball of molten glass enough for one bangle. This he winds off like treacle upon the end of the iron spit (*sallákh*) into a thick irregular ring. He now throws down the iron hook, takes up the dagger-shaped pressing tool (*mála*), and resting the end of the iron spit round which the glass ring is wound on the stone slab (*patri*) taps and squeezes the ring until it has half cooled. The iron wire (*barhána*) is next inserted between the spit and the ring of glass, which is thus detached from the spit and left on the iron wire. From the end of the iron wire it is transferred to the tip of the tapering clay cone (*kálbut*). The workman then holds the clay cone towards the opening in the furnace, pressing its thin iron handle between his open palm and the surface of the stone slab in such a way that the clay cone is slanted upwards towards the furnace. In his other hand he holds the iron wire which he inserts between the clay cone and the glass ring. Next by rubbing his open palm with the handle beneath it backwards and forwards over the stone slab he causes the clay cone to spin rapidly round, and the glass ring upon its tip becomes gradually enlarged and slips down to the broad base of the cone until it has grown to the size of a bangle. It is then slipped off and thrown to cool into

the pit between the stone slab and the furnace. In Sháhjahánpur and Budaun the glass ring is transferred from the iron spit of uniform thickness (*sallakh*) to the tapering iron spike (*kli*), and from that to the clay cone. The use of this additional tool is said to produce more evenly shaped bangles. One skilled workman at the big centres of the trade can turn out one thousand plain bangles in one day, working for nine hours. At the smaller factories the average daily outturn of a workman is only five hundred a day. Native glass is used everywhere except in Aligarh and Saháranpur, where certain transparent twisted bangles are made of European glass.

Section V.—(1) The Kashmiri *chúri* is decorated with lozenge-shaped splashes of white or blue on its outer surface. This is effected

The manufacture of bangles of complicated patterns.

by ranging minute white or blue English beads in a straight line in the bottom of the iron ladle, and rolling the small ring of molten glass on the end of the spit once over the straight line, thus taking up all the beads on its outer surface. These melt during the other processes and becoming elongated by the rotation, are pressed down into the glass ring by the *mála*.

(2) The *dáwáli chúri* is decorated in the same way with lozenge shaped splashes of white, which are however prominent above the outer surface of the bangle and rough to the touch. They are produced by attaching small pieces of prepared white glass wire to the plain bangle, which is not pressed by the *mála*.

(3). The *bánk*, a fluted zig-zag bangle, is made by the use of a clay cone with a toothed ridge projecting round its base. When the bangle has slipped down to the toothed ridge it is pressed into the indentations with the iron wire.

(4) The *aintwa* is a bangle of twisted transparent white glass enclosing coloured glass of various colours. To make this a piece of unmolten white glass is held on a potsherd inside the furnace till it is softened, and then kneaded into a flat cake and doubled over like a half open book. Between the leaves of this book the workman places three parallel sticks of coloured glass wire which he securely imprisons by flattening down the leaves. This operation is called *pardah karna*. He then beats the glass again on the end of the iron spit (*sallakh*) and works it into an oblong. Next he fixes the iron pin (*chitarna*) to the free end of the glass and twists it once or twice. Then another workman takes the *chitarna* and between them they draw the glass out into a thick wire twisting it all the time. The wire is then broken up into lengths of six or seven inches and passed on to a third workman to fashion into bangles. The latter holds a length of glass into the furnace by a pair of pincers till the ends are melted enough to unite. He joins the ends, warms up the whole ring of glass thus formed, twists it on the clay cone, and throws it into the pit to cool.

(5) The *mathiya* is a broad plain bangle, the rim of which is overlaid with three flattened twists of coloured glass. The central twist is the thickest and is made of three wires of differently coloured glass. It is called *deorha*. The two outer twists contain only two wires of glass and are called *sár*. Each wire is drawn out separately by two men and then the various wires are plaited and twined round one another to form the twists. The broad plain bangle is then heated up, and the three twists pressed into its rim so as to overlay the whole of it.

Section VI.—In most districts the bangle-maker is a *chúrihár*. The number of male *chúrihárs* at the census of 1891 was 13,914 Muhammadans, of which 7,243 were in the Gorakhpur division, and 363 Hindus, of which 231 were in the Allahabad division. The manufacture is also carried on, however, by

Bangle-makers and their methods of co-operation.

Muhammadan *manihars*, who are properly only sellers of bangles, in Saháranpur, Aligarh, Bulandshahr, Bijnor, Budann, Bareilly and Dehra Dún; by Hindus, *lakheras*, in Banda and also in Aligarh; and in Hamirpur by two castes who are probably only subdivisions of the *manihar* caste, but who are not noticed in the census report, called *chúroiri* and *kacherei*. In Etah bangles were formerly made by a family of Kayasths. A very large number out of these castes do not actually engage in bangle-making, and a considerable number, shown in the census report as 19,634, combine the occupation of bangle-making with agriculture.

The manufacturers using one furnace usually belong to one joint family and so share the expenses and profits equally. But in Etah there is a headman to whom the furnace belongs and by whose name the factory is known, though he gains no advantage from this except the power to turn away any workman whom he does not like and to make general arrangements. All workmen contribute equally to the expenses of the fuel, but obtain all their materials separately and make their own profits. In Aligarh the same plan is followed, except for the fact that there is no headman. In the same district there are one or two capitalists who employ labourers for one chittak of ghí and four annas a day and keep the whole profits of the bangle-making to themselves; but this occurs nowhere else in the provinces. In most districts boys are not allowed to work at the furnace, but in Etawah, Mainpuri and Aligarh they outnumber the men, and it seems surprising that their health does not suffer.

The women and girls of the family are employed in tying up the bangles into rows and packing them in baskets ready for exportation.

Section VII.—The wholesale price of plain coarse bangles, such as are worn

Wholesale price of bangles and profits of workmen.

by the lower castes, is extraordinarily low at the great centres of the trade. In Etawah and Mainpuri the average selling price is 3,000 for Re. 1 and Rs. 25 for one lakh. In Aligarh and Hamirpur one thousand are sold for 15 annas. The finer kinds are a good deal dearer; those of Firozabad sell at the rate of Re. 1 for 500, and the transparent *aintuás* of Saháranpur and Aligarh at the rate of Rs. 4 per 1,000. One seer of black glass produces one hundred bangles and one seer of green glass produces one hundred and fifty. On an average for all kinds of bangles it appears that seven seers produce 1,000 bangles. The profits of a skilled workman on the manufacture of plain bangles may therefore be calculated as follows :—

	Ra.	a.	p.
7 seers crude glass at 25 seers a rupee	0 3 3
2½ chittaks colouring materials at 24 seers per rupee	0 1 0
Share of fuel	0 2 0
Total cost price of 1,000 bangles	0 7 0
Selling price of 1,000 bangles	0 15 0
Daily earnings of one skilled workman	0 8 0

This calculation seems to hold good for the manufactures in the northern districts. In Etawah and Mainpuri however the daily earnings are given as less than 2 annas a day, and if small boys, who are not big enough for any other work, were not employed by their parents, the manufacture could scarcely be made to pay.

Section VII.—The retail trade in glass bangles is invariably carried on by *manihars*. The bangles are bought wholesale at their

The retail trade in glass bangles.

place of manufacture by a travelling merchant, *beopári*, and when he arrives at large towns, such as Lucknow, the *manihars* club together and buy up the whole of his stock. Before being sold a large number of plain bangles are decorated with lac, tinfoil beads and small pieces of mirrors.

Dr. Hoey's account of the trade and profits of a *manihār* of Lucknow written in 1880, which embodies all important details, is as follows :—

"The usual prices paid are—

Plain, uncoloured glass	Rs. 1 for 1,000 <i>chūris</i> .
Plain, but coloured glass „	Rs. 2 ditto
Scolloped and coloured glass	Rs. 3 ditto.

"These are then made up into sets, and 50 usually go to a set, i. e., 25 for each wrist.

"Take a case at random among the *manihārs* at Aminabad. I find a set of this number made up as follows selling for 2 annas 6 pies :—

Plain coloured glass,	9 for each hand.
Covered with <i>panni</i> (foil)	12 ditto.
Studded with beads and glass <i>naginas</i>	4 ditto
Total	25 for each hand.

"The *panni*, beads (pot) and *naginas* are fixed on the glass *chūris* by means of a layer of lac. Lac of the quality used is purchased at Rs. 1 per seer and one tola is required to make up $2\frac{1}{2}$ sets of *chūris*. *Panni* is bought for 4 *taos* or sheets the *paisa*, and one *tao* suffices for 30 *chūris*. Beads are Rs. 2 the seer, but *manihārs* buy by the *guchhi* (or string of beads), 5 *guchhis* for 9 pies; one *guchhi* is ample for a set of *chūris*. *Naginas* are 2 *paisa* for a tola, and a tola does for 12. The *chūris* account for this set is therefore—

	Rs.	a.	p.
10 <i>chūris</i> at Rs. 2 per 1,000 }	...	0	1 1
32 " " 1 " " }	...	0	0 0-6
<i>Panni</i> for 24 <i>chūris</i>	0	0 4-8
Lac "	0	0 1-8
Beads "	0	0 0-25
<i>Naginas</i> "	0	0 1-92
Charcoal at Rs. 1 per 100 sets of <i>chūris</i>	0	0 10-37
Total	...	0	1 10-37

"This gives a profit of $6\frac{5}{8}$ pies per set of *chūris* selling for $2\frac{1}{2}$ annas."

In some districts, such as Dehra Dūn, the manufacturing *manihārs* also carry on the retail trade in the villages, but this is not the common practice.

Section IX.—Besides the Kashmiri the *danawāli*, the *bāsk*, the *aintwā* and the *mathiya* described in section V, the commonest kinds of glass bangles are the following :—

Commonest kind of bangles and the classes by whom they are worn. (1) *Gumaru band*, a thick bangle about $\frac{1}{4}$ inch broad, consisting of two bands of glass, a horn coloured one overlaid by a band of opaque rusty brown (*lāl*), green (*harā*) or yellow (*pinglā*, in the *manihār's* dialect).

(2) *Iacha* or *kareli*, a very thin black or dark green bangle.

(3) Bangles of transparent coloured glass.

(a) <i>Gulabi</i>	...	...	rose-colour.
(b) <i>Surkh</i>	...	...	crimson.
(c) <i>Sonechri</i>	...	...	amber.
(d) <i>Safaid</i>	...	...	white.
(e) <i>Dākhi</i>	...	...	dark-green.
(f) <i>Asmāni</i>	...	...	thick dark-blue.

Women of different castes wear different kinds and combinations of bangles. The following are a few of the combinations noted in Dehra Dún :—

A Purbia woman, *káchi* or *lodha*, wears :—

- (1) 4 *lal gumru band* just below the elbow.
- (2) 4 *pingla* " " " "
- (3) 4 *hard* " " " "
- (4) 4 *pingla* " " " "
- (5) 4 *lal* " just above the wrist.

A set of these for two arms sells for one anna.

A more expensive set for the same woman is :—

- (1) 2 almond coloured Kashmiri.
- (2) 2 green "
- (3) 10 black "
- (4) 2 green "
- (5) 2 almond coloured "

A set of these for both arms, 36 in all, costs 2 annas.

A woman of the *bráhma*n or *bania* castes will wear a set of bangles of unmixed transparent colours as follows :—

- (1) 8 amber.
- (2) 2 crimson.
- (3) 4 rose-coloured.
- (4) 2 crimson.
- (5) 8 amber.

A set of these for both arms, 48 in all, costs 3 annas.

A Hindu prostitute will wear :—

- (1) 4 black *kareli*.
- (2) 1 green zig-zag bangle (*bánk*.)
- (3) 4 green *kareli*s.
- (4) 2 black *bánk*s.
- (5) 4 green *kareli*s.
- (6) 4 black *kareli*s.

This set sells for about 1 anna 6 pies.

A woman of the *chamár* caste never wears anything but the *mathiya* bangles, 8 or 10 on each arm.

Musalmaán women in Dehra generally wear *aintwa* bangles, if they wear any at all.

A respectable woman in Dehra and the northern districts will never wear a zig-zag bangle, *bánk* or a *kareli*, as these are the marks of a prostitute. In the south and east however this is not the case, a prostitute rarely wearing glass bangles of any description.

The commonest patterns in bangles overlaid with lac and ornamented with tin foil and beads are :—

- (1) *Patri*, pieces of mirrors looped in bands of beads. This is generally worn in the centre of a set of bangles.
- (2) *Karra*, pieces of mica surrounded by rings of beads, worn on each side of the *patri*.
- (3) *Chaodáni*, ornamented with clusters of four beads.

- (4) *Sákáni*. Gilt foil over lac.
 (5) *Karra* (No. 2) overlaid with alternate patches of gilt and green foil divided by indentations.
 (6) *Band*. Gilt foil over lac marked with ribbed indentations.

Section X.—Most Hindu and Muhammadan spinsters and wives wear glass bangles.

Among the Muhammadans in the plains green or yellow glass bangles are always worn by the bride at the marriage ceremony, while in the hill districts it is the custom to wear black bangles, which are considered peculiarly auspicious, on that occasion. When a Hindu woman becomes a widow she goes to the side of a river or tank on the 13th or 10th day after her husband's death and breaks her glass bangles against a stone, throwing the fragments into the water. She never wears glass bangles again.

A result of this practice is that it is considered extremely unlucky for a Hindu woman to break her bangles by mistake, as it may be an omen of the breaking of her marriage bond, and loss of her husband's presence by death or of his love. To ward off this evil omen a married woman kisses the fragments before throwing them away. An unmarried woman of course does not go through this ceremony.

CHAPTER XII.

THE MANUFACTURE OF, AND TRADE IN, BLOWN ARTICLES MADE OF COUNTRY GLASS
AND EUROPEAN GLASS, AND THE MANUFACTURE OF MOULDED ARTICLES.

Section I.—Small phials (*shiski*) and flasks for holding Ganges water (Ganga *jol* or Ganga *joli*) are blown in Aligarh, Bareilly, Bijnor, Bulandshahr, Etah, Rae Bareilly and Saháranpur. In Saháranpur are also made by blowing

syphons (*pāndrá*), toys full of coloured liquid called *panchkora*, and glass mouthpieces for *huggas* (*munhmal*). These are all apparently made from country glass. In Benares, Dehra Dún and Lucknow are made by blowing pickle-jars, small lamp globes, lamp-chimneys, vases, and phials from European glass.

In Benares also there are four workshops which turn out the thin glass known as *tikli* glass used for the manufacture of the *tikli* or glass patches worn on the forehead by Hindu women.

The chief centres of the trade in phials and flasks of country glass are Najibabad and Nagina (Bijnor), where there are fifteen factories, Sikandar (Aligarh) and Rámpur (Saháranpur). The exports from all these places are said to be very large, but no estimate is given of their value. The lamp-chimneys and other articles made from European glass in the three districts mentioned are all locally consumed.

Section II.—The furnaces for the manufacture of blown articles are in all districts called *dás*. They vary considerably in shape, but all resemble one another in the possession of at least one annealing oven. They are always built

under a roof. The following is a description of the furnace in use in Lucknow. This furnace is a clay cube about 5 feet high, 10 feet long, and 3 feet broad, built over a pit in which the wood burns. It is divided up into two stories. The lower front compartment is directly above the fire and its floor is pierced with a hole through which the flames come. This lower front compartment is used for the melting of the glass, which is either held over the flames until it is soft or fused in a large crucible called *khudá*, which is let into the noor of the melting compartment so that its bottom

is above the actual fire. The melting compartment has one large horse-shoe shaped door in front and smaller ones on each side. In front of the large door is an earthenware screen with a semi-circular groove in it, called *adī*. This serves as a rest for the rod at the end of which the vessel is twisted round at one of the stages of manufacture. The upper front compartment and the two back compartments are annealing ovens (*soḍān*) for the cooling off of the vessels when made. The upper front compartment is the hottest and the lower back compartment the coolest. The vessels are left to cool in each compartment for four hours before being exposed to the outside air. The fuel used is wood. The consumption of fuel is about one maund a day and the amount of glass fused is rather more than 4 seers a day. The blowing furnaces of most districts seem to be worked on much the same scale as that of Lucknow, but in Aligarh and Bijnor very large amounts of glass are melted up at one time in the front melting compartment, and in order to prevent waste of fuel work goes on night and day for several weeks when the furnace has been once started.

Section III.—The tools used in the manufacture of blown articles are :—

- Tools used.
- (1) *Nāl*, *phūnkā* or *dhotāli*, an iron blow-pipe, usually a piece of an old gun barrel.
 - (2) *Kūnd*, *kuñj*, or *sarkendi*, a solid bar of iron which is attached to the bottom of the bubble of glass when blown.
 - (3) *Mālī*, a dagger-shaped pressing instrument described in the last chapter.
 - (4) *Māsā* or *māshā*, pincers of stout iron wire, shaped like a big hair-pin, used for working the rough edges of an article into shape and separating it from the blow-pipe.
 - (5) *Chim'a* or *ambār*, broad iron tongs for placing broken pieces of glass in position in the furnace.
 - (6) *Sikk*, iron spit for moving about and turning over the melting glass.
 - (7) *Sil*, slab of stone on which the end of the blow-pipe is rolled round to squeeze together the pieces of glass picked up.
 - (8) *Chakal*, a disc of warmed country glass by which a lamp-chimney is fixed on to the *kūnd* (iron rod) in one of the final stages of manufacture. The country glass, being a different substance from the European glass, does not coalesce with it, and is easily detached when the chimney is complete.

Section IV.—The glass-blower of Lucknow uses chiefly old broken railway lamps which he buys at the rate of Rs. 8 for one maund twenty eight seers. When he cannot get these he uses either flint glass made at Mandra in the Rawalpindi district of the Panjāb which he buys at Rs. 4 a maund, or broken fragments of glass articles made by himself which he buys at Rs. 2 a maund. For coloured articles he uses broken coloured English glass at Rs. 10 a maund. The fact that the flint glass of the Panjāb serves as an inferior substitute for European glass is interesting. The Benares glass-blower is said to obtain broken European glass for Rs. 4 a maund, and the Dehra Dūn glass-blower buys fragments of wine glasses, tumblers and old lamp-chimneys from sweepers for 3 annas a seer.

Section V.—The process of blowing is practically the same in all districts, whether conducted with European or country glass. The following is a description of the making of a glass pickle-jar or *achāri* at Lucknow.

Process of manufacture of blown articles.

There are two workmen engaged at the furnace. A broken tumbler is placed on the floor of the front melting compartment or the edge of the hole through which the flames of the fire are shooting up. After

about five minutes the first workman takes it up with the tongs, and attaches it to the end of the blow-pipe, which he has previously smeared with a gum made of salt-petre, borax, arsenic and water. He then hands it on to the second workman, and receives from him a second blow-pipe with a fused mass of glass attached to its end, which he will blow and shape while the fragment of the tumbler is in the hands of the second workman. The latter holds the fragment of the tumbler over the fire at the end of the blow-pipe for about five minutes until it is thoroughly fused, when he takes it out and rolls it round on the stone slab, patting it into a round ball with the dagger-shaped tool called *māto*. After this he plunges it into a jar of water to cause all the air bubbles to escape, and fuses it again over the flames for another five minutes. He then hands it over to the first workman, who warms it once more and then blows into the pipe for about ten seconds till a bubble one inch long protrudes from its end. He repeats this warming and blowing process three times until the bubble is four inches long. Then he places the blow-pipe on the grooved rest in front of the furnace, so that the bubble of glass is over the flames and twirls it rapidly round in order to get the shape even. After this he swings the blow-pipe twice round his head elongating the bubble by the centrifugal force, and warms it again. This swinging and warming process is repeated five times. He then flattens out the bottom of the bubble by pressing it against the side of the furnace. Next he takes the *kūnd*, a solid bar of iron, and sticks it into the centre of the bottom, making the bottom rise into a cone inside the vessel. The glass bulb is now held between the blow-pipe and the iron bar. The workman next takes the tweezers of stout iron wire, dips them into water and grips the stem of the bulb with the tweezers just at the point where the blow-pipe inside the stem ends. The stem cracks round this line under the touch of the moist tweezers, and the blow-pipe is left with about three inches of neck round its end, while the main body of the vessel is stuck by its bottom to the iron bar. The fragment on the blow-pipe is knocked off and put among the broken glass to be melted up again. The workman now turns the iron bar, to which the incomplete vessel is fixed, on the socket in the screen before the furnace, until the rim is well warmed. He then takes it out and works the tweezers about inside the rim of the vessel till he has got it to the proper shape. The vessel is then cooled for four hours in each of the three annealing ovens. An article such as a lamp globe or lamp-chimney, which is open at both ends, is not put into the annealing ovens, as the quick contraction in the cool air does not cause it to crack.

The waste of glass in melting is about 10 per cent. The *tikli* glass of Benares is made by blowing a very big bubble of glass and breaking it into fragments.

Section VI.—The manufacture of flasks, &c., from country glass is generally in the hands of a capitalist who employs paid labour. Two workmen who manage the blowing are employed for 6 annas a day, 1 chittak of ghi and vegetables, and two others called *astigars* are

paid Rs. 4 a month to stoke the furnace, pick up the vessels when made and set them to cool; all the workmen do two spells of six hours each in the twenty-four in places where, like in Aligarh and Bijnor, the furnaces work day and night. They have holidays on Tuesdays and Fridays, and work all the year round. One blower can shape 300 small flasks in six hours.

The profits of the proprietor of the workshop are calculated as follows :—

	Rs.	a.	p.
7 seers crude country glass	0 2 3
Wages of 2 blowers for 3 hours	0 4 0
Unskilled labour, stokers and coolers	0 2 0
Fuel	1 0 0
Total, 100 flasks produced for	1 8 3
Do. sold for	2 0 0

The proprietor's profits are therefore $33\frac{1}{3}$ per cent.

Section VII.—In the Lucknow workshop, which apparently closely resembles those of Benares and Dehra Dún in its methods, there work three men all of one family, two blowers and one stoker, who produce four seers of goods a day.

Profits of the maker of articles from European glass.

The profits of this family for one month of thirty days may be calculated as follows :—

	Rs.	a.	p.
132 seers of old glass	16	8	0
30 maunds of fuel at 3 maunds a rupee	10	0	0
Result, 120 seers new goods produced for	26	8	0
Sold @ 11 annas a seer for	82	8	0
Monthly profit	56	0	0

The profits of the Benares makers of *tikli* glass are calculated in the same way to be 2 annas in the rupee.

Section VIII.—Moulded glass articles are made in only two districts in these provinces, at Najibabad and Nagina (Bijnor) and at Rámpur in the Deoband táhsíl of Saháranpur. Those made at Najibabad and Nagina are small flasks shaped like cheap Venetian scent bottles. At Rámpur are made heavy ink-pots of light and dark-blue glass, and paper polishers called *ghonta* shaped like a flat pestle.

The mould for the scent bottles of Bijnor is made of clay in two halves on an imported European bottle. The two halves are then joined together, the molten glass on the blow-pipe is inserted into the neck of the mould, and blown until the mould is filled up. No account is given of the process practised at Rámpur.

Section IX.—Glass beads were until quite recently manufactured at Lucknow and at the villages of Sowansa and Naurer, Partábgarh. The beads of Partábgarh were exported in large quantities to the Central Provinces by the traders of Badshahpur, an important mart in the Jaunpur district. During the last five years, however, these local manufactures have succumbed to the competition of the cheap German beads, which are made exactly to resemble the native article, and there seems to be no prospect of their revival. No account of the methods of manufacture formerly practised can be obtained.

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